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Initialled abstracts and reviews not by Bureau staff are by R. J. Garner, N. H. Grubb, A. M. Massee, H. B. S. Montgomery and S. C. Pearce of the East Malling Research Station and by N. B. Bagenal and J. K. Eaton.

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MISCELLANEOUS.

General.

725. TUKEY, H. B.

*Horticulture in science and society.**Proc. Amer. Soc. hort. Sci.*, 1948, 51: 685-94, bibl. 55.

The author sums up the gist of his presidential address in the words of L. H. Bailey as follows: "The horticulturist is the man who joins hands with the plant biologist on the one hand and with the affairs of men on the other, and whose energies are expended in every way in which plants appeal to men."

726. CAIN, S. A.

*Plants and vegetation as exhaustible resources.**Science*, 1948, 108: 587-8, being an abstract of a paper presented at the American Association for the Advancement of Science, Centennial Celebration, 1948.

"It is the thesis of this address that much of man's basic needs for food, clothing, and shelter—with which his economy has always been concerned—are directly or ultimately of plant origin, and that these natural resources are not quantitatively adequate to permit a continuing consumption at present world rates, with the result that men everywhere must face squarely the dual problems of the conservation of natural resources and the limitation of population or continue along the path, with an accelerating rate, toward self-destruction."

727. CASHMORE, A. B.

*The Commonwealth Agricultural Bureaux.**J. Aust. Inst. agric. Sci.*, 1948, 14: 162-6.

A short account of the origins and workings of this organization. It comprises 11 bureaux and 2 institutes, whose main function is to act as effective clearing houses of information between research workers in agricultural science throughout the various parts of the Empire.

728. JACKS, G. V.

*The Commonwealth Agricultural Bureaux.**Research*, 1949, 2: 132-3.

A note on the development and work of the C.A.B., with special reference to the Bureau of Soil Science.

729. HORTICULTURAL EDUCATION ASSOCIATION.

*A list of recent publications on horticulture and its sciences.**Sci. Hort.*, 1949, 9: 171-3.

A list of 82 publications, including 48 books, which have appeared, or been notified, since the last list was published in *Occasional Publication on Scientific Horticulture*, No. 5 (March, 1947).

730. DAVIS, M. B.

*Horticulture across Canada.**(Mim.) Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 63-71.

A highly condensed account of some of the many horticultural investigations in progress from Nova Scotia to British Columbia. The following are amongst the projects touched on: rootstock studies with Malling and French crab stocks and seedlings of *Malus baccata*, Antonovka, and *Malus siberica maxima*; trials of apple and pear framework stocks; breeding of

new pome, stone, and soft fruit varieties with particular reference to resistance to cold, diseases, and pests; the use of colchicine to induce polyploidy in apples; vegetable breeding and seed production; improvements in ornamental horticulture, including bulbs; manorial experiments; soil investigations; chemical plant tissue tests with potatoes to study nutrient levels; control of weeds.

731. SANDERSON, M.

*The climates of Canada according to the new Thornthwaite classification.**Sci. Agric.*, 1948, 28: 501-17, bibl. 10, illus.

The relationship of water surplus and water deficiency to water need, defined by the Thornthwaite classification, provides a new attack on the complex problems of climate in agriculture. Crop testers and plant breeders have always been hindered in their work by lack of fundamental climatic data and quantitatively defined climatic regions. The maps of potential water need and water deficiency presented here for Canada partially fill this gap. The map of climatic regions indicates homoclimes for the benefit of the crop tester. The plant pathologist could gain a clearer knowledge of the climate advantageous to insect pests and disease organisms through a correlation of the times of infestation and the life cycle of the pathogen with related water surplus and deficiency. [From author's summary.]—Ontario Research Foundation, Toronto.

732. SHEPHERD, F. W.

*Agriculture in the Isles of Scilly.**Agriculture*, 1949, 55: 528-36, illus. + 1 map.

Much of this article is given to an account of flower growing, mainly narcissus, the mainstay of the islands. Flower exports may amount to 120 tons per week at the peak of the season. The growing of early potatoes, of which a short description is given, provides a useful alternative to bulbs. The narcissus picking season is from November to the end of April. Potato lifting begins about the end of April and continues for 6 weeks. Weeds, high winds, and heavy transport charges are among the major difficulties faced by growers. Great efforts are being made to improve the quality of the bulbs grown.

733. SKINNER, F. L.

*Highlights of a [Canadian's] visit to Sweden.**(Mim.) Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 61-3.

Brief notes are given on numerous interesting plants seen in Sweden. The view is expressed that there are many Swedish plants which would be of value to Western Canada.

734. SALMON, S. C.

*Crop improvement in Japan.**J. Amer. Soc. Agron.*, 1948, 40: 1017-35, bibl. 11.

The impressions of an American observer of the state of Japanese agriculture, and the extent to which plant breeding and research into cultural methods has helped to increase yields in recent times. The report includes notes on tea and silk production, plant breeding methods and the agricultural experiment stations of Japan.

735. MOLODČIKOV, A. I.
The great reformer of nature Ivan Vladimirovič Mičurin. [Russian.]
Nauka i Žiznj (Science and Life), 1948, No. 12, pp. 15-23, bibl. 7, illus.
 This article begins with a discussion on Darwinism and leads up to an account of the life and work of Mičurin, whose work on the hybridization and grafting of fruit trees is summarized.

736. TAYLOR, C. R.
Phenomenal growth from use of Rotorua's natural heat.
N.Z. J. Agric., 1948, 77: 382-3, illus.
 This short article discusses the possibility of making more use of New Zealand's hot springs, such as those at Rotorua, for horticultural purposes. A small glasshouse efficiently heated from a nearby boiling pool at low initial cost and practically no running expenditure is illustrated. The phenomenal growth of outdoor tomatoes shows the influence of the hot water and steam in raising the soil and air temperature well above the minimum required for vigorous growth.

737. MINISTRY OF AGRICULTURE, LONDON (BENNETT, L. G.).
The co-operative marketing of horticultural produce in England and Wales.
Econ. Ser. Minist. Agric. Lond. 49, 1948, pp. 68, H.M.S.O., London, 1s. 3d.
 These are the findings of an enquiry into the origin and subsequent history of all the known existing English and Welsh horticultural organizations sponsored by the growers conjointly, whether primarily for marketing or for other purposes. Factors making for success or failure are considered and the preliminary steps essential before establishing new organizations are discussed at some length.

738. GLOVER, F.
Certification schemes for growing plants [in Britain].
Sci. Hort., 1949, 9: 123-6.
 A paper, dated September 1946, which includes descriptions of the schemes for: potatoes, strawberries, blackcurrants, raspberries, hops, and fruit tree rootstocks.

Recent developments.

739. SPINKS, J. W. T.
The application of radioactive tracers in horticulture.
(Mim.) Rep. Proc. W. Canad. Soc. Hort., 4th annu. Meet., 1948, pp. 58-60, bibl. 10.
 The author indicates the many possible applications of radioactivity to horticulture. Relatively little has been done in this field so far, presumably because of the lack of people with knowledge of both horticulture and radioactive isotopes.

740. GRINSTEIN, M.
El uso de isótopos en las investigaciones biológicas. (The use of isotopes in biological investigations.)
Cienc. y Invest., 1948, 4: 96-106, bibl. 51.
 A technical account of the chemistry of radioactive and heavy isotopes and the way in which they can be used as tracers in biological and physiological investigations.

741. STOUT, P. R., AND OTHERS.
The use of radioactive tracers in plant nutrition studies.
Proc. Soil Sci. Soc. Amer. 1947, 1948, 12: 91-7, bibl. 15, illus.
 A review of the application of radioactive isotopes to studies in soils and plant nutrition with examples of several types of application taken from work done in the Divisions of Soils and Plant Nutrition, University of California. [For work at Wisconsin see also 1281.] Methods of detection and their level of sensitivity are discussed. General topics illustrated with experimental work are: direct tracing of gross transport of salts in living systems; general applications of "tracer chemistry"; autographic techniques; micronutrient element studies with radio-isotopes of high specific activity; application to fertilizer studies; exchange reactions; special role of radioactive carbon in plant and soil studies; and studies with fission products. The work discussed involved the use of 19 different radioelements. [From authors' summary.]

Statistical method.
(See also 937.)

742. QUENOUILLE, M. H.
The analysis of covariance and non-orthogonal comparisons.
Biometrics, 1948, 4: 240-6, bibl. 4.
 This paper suggests a method of eliminating differences which do not arise until after the experiment has been planted; for instance where a supposed clonal rootstock proves to be a mixture of two clones, or where the removal of a neighbouring trial exposes some trees previously guarded like the rest. S.C.P.

743. SCHUYLER, G. L.
The ordering of n items assigned to k rank categories by votes of m individuals.
J. Amer. statist. Ass., 1948, 43: 559-63.
 There are a number of items (e.g. apple varieties, cans of fruit) and all are submitted to the judgment of several persons, each person assigning the items to classes according to excellence or otherwise. Some judges cannot make up their minds about some items. This paper suggests a method for dealing with the resulting data. S.C.P.

744. PEARCE, S. C.
Randomized blocks with interchanged and substituted plots.
J. roy. statist. Soc. (Ser. B), 1948, 10: 252-6.
 Solutions are given for Randomized Block experiments in which (i) two plots in different blocks have been accidentally interchanged, (ii) certain plots of one treatment have been substituted by plots of another treatment already in the trial. [Author's summary.]—East Malling Res. Stat., Kent.

745. PEARCE, S. C., AND TAYLOR, J.
The changing of treatments in a long-term trial.
J. agric. Sci., 1948, 38: 402-10, bibl. 3.
 The changing of treatments during the course of

experiment is discussed both from the point of view of designing trials in which changes are anticipated and of modifying trials that have fulfilled their original purpose. Cases are distinguished according to whether the interactions of original and new treatments are or are not important and recommendations are made for each case. [Authors' summary.]—East Malling Res. Stat., Kent.

Growth and periodicity.

746. ROODENBURG, J. W. M.

Daglengte, bloemvorming en bloei. (Day length, flower initiation and flowering.)

Vakbl. Biol., 1947, 27: 65-76, bibl. 28.

Much confusion has arisen from the use of the terms "short day" and "long day" plants. The author explains how, in the light of modern theories, these terms have outlived their usefulness. He gives a clear account of the relationship between photoperiodism, vernalization and dormancy, so far as it is understood, and discusses the effect of intensity, duration and colour of light on flower induction.

747. BORTHWICK, H. A., HENDRICKS, S. B., AND PARKER, M. W.

Action spectrum for photoperiodic control of floral initiation of a long-day plant, wintex barley (*Hordeum vulgare*).

Bot. Gaz., 1948, 110: 103-18, bibl. 8, illus.

A specially designed spectrograph was used to study the light reaction that promotes flowering in the long-day plant, wintex barley. By interrupting the dark period with brief periods of irradiation in restricted wavelength regions, it was possible to relate photoperiodic effectiveness of light to wavelength, and thus obtain an action spectrum. It was found that the action spectrum for the production of spikes in barley was very similar to the action spectra for the prevention of floral initiation in soya beans and cocklebur (short-day plants, that had been studied previously). A working hypothesis based on the assumption that flowering both in long- and short-day plants is controlled by the same substance and that effectiveness is due to optimum concentration is discussed. [See also H.A., 16: 351.]—Bureau of Plant Industry, Soils and Agricultural Engineering, Beltsville, Md.

748. ŠČEPOTJEV, F. L.

The duration of the photoperiodic residual effect in woody plants. [Russian.]

Priroda (Nature), 1948, No. 11, pp. 57-9, bibl. 13.

The author reviews opinions expressed by other workers on the duration of the residual effect of short-day illumination on woody plants, and then records his own observations. Data are presented of an experiment with the white mulberry (*Morus alba*). The young seedlings had been exposed to short-day illumination for 5, 9, or 10 hours during 5, 10, or 15 days. The figures, for the trees when 8 years old, indicate that positive results (compared with those of a plant exposed to natural illumination) in relation to increased dry weight of leaves and their "wholeness" (lack of lobing) were obtained by those plants exposed for 5 hours during the three periods of exposure tested,

5 hours for 5 days giving the highest figure for dry leaf weight.

749. VAN RAALTE, D.

Periodiciteit bij de aanleg der verschillende plantendelen. (Periodicity in the initiation of various plant organs.)

Cult. Hand., 1948, 14: 634-6.

Examples are given of the effect of short-day and long-day treatment on a number of ornamental plants, and on strawberries. By regulating the day-length and temperature with strawberry plants fresh fruit can be obtained all the year round.

750. GRAINGER, J.

Growth cycle metabolism of plants in relation to flowering.

Ann. appl. Biol., 1948, 35: 624-37, bibl. 18.

The time of formation of the flower initial in fumitory, leek, radish and yellow water-lily corresponds to a maximum in the curve showing percentage of total carbohydrate plus percentage of ash in the whole plant. Pea and bean make their flower initials very early in the growth cycle, at a time when the amounts of carbohydrate plus ash are high because of the attachment of the plant to the large seed.—West of Scotland Agricultural College, Auchincruive, Ayr.

751. SCOTT, F. M.

Internal suberization of plant tissues.

Science, 1948, 108: 654-5, bibl. 4.

Suberization of the internal surface, i.e. of the intercellular spaces, has already been reported in the leaf of the Valencia orange, *Citrus sinensis*. Reference is made to a survey of more than 50 plant species, which confirms the surmise that suberization might occur generally in all tissues of vascular plants throughout the plant kingdom. The fact that suberin occurs apparently around and within all living cells in the numerous tissues so far examined appears to call for consideration in future discussions of such theories as transpiration, conduction, abscission, cellulose deposition, and permeability.

752. HEWITT, S. P., AND CURTIS, O. F.

The effect of temperature on loss of dry matter and carbohydrate from leaves by respiration and translocation.

Amer. J. Bot., 1948, 35: 746-55, bibl. 10.

An attempt is made to correlate the parts played by respiration and translocation in the loss of dry matter from leaves over a range of temperatures. Respirational losses from leaves of bean, milkweed and tomato plants increased progressively with higher temperatures when plants were held in the dark. Translocation losses increased progressively up to 20° C. only. It is suggested that above this temperature the limiting factor to transport losses is the amount of material available for transport, as so much is consumed in respiration.—Cornell University, Ithaca.

753. MANN, L. K.

Morphological development of parthenocarpic fruits.

Proc. Amer. Soc. hort. Sci., 1948, 52: 226-32, bibl. 35.

In most fruits set by growth substances, although carpel or ovary wall development is normal or nearly so,

seed coat development is much more variable. In about 80% of plants, including the tomato, seed coats do not develop, whereas in watermelon they do develop. In fruit set by growth substances no embryos develop. Hence, in crops where the seed is the economic product no improvement in yield can come from the use of growth substance as a substitute for pollination. Where growth substances are used in conjunction with pollination, fertilization and endosperm and embryo development generally proceed normally.

754. ASHBY, E.

Leaf shape and physiological age.

Endeavour, 1949, 8: 18-25, bibl. 2, illus.

"The change in shape from leaf to leaf on a stem raises four major problems: how shape is determined by local differences in cell division and growth; the chemical and physical background to these differences; the mechanisms by which environment affects leaf shape; and whether leaf shape is related to maturity. The last two of these problems are discussed and illustrated. Modern techniques show promise of ultimately revealing the basic causes and significance of leaf shape."

755. KOSTOV, D.

Studies of the nuclear and nucleolar cycles of development in plants, animals and man, particularly with reference to the ageing of chromatin and other cytogenetic phenomena. [Bulgarian with summary in Russian and English.]

Bull. Cham. Cult. nat. Ser. Biol. Agric. Silvic., Sofia, 1946, 1: 1-86, bibl. 135.

A cytological study including haploid, diploid and polyploid forms of a number of horticultural plants.

756. RAYNER, M. C.

Mycorrhiza and the growth of farm crops. *Chem. Industr.*, 1949, No. 7, pp. 106.

A report of a paper read on 12 January, 1949. The majority of farm and garden crops are regular mycorrhiza-formers, and it is suggested that certain features of mycorrhizal infection, characteristic of healthy root growth, could provide a delicately adjusted index for estimating the effects of cultural treatments and a ready means of recognizing favourable or unfavourable soil conditions.

Growth substances.

(See also 782, 891, 918, 919, 1164, 1167, 1171-1195, 1219, 1246, 1287-1289, 1323-1325, 1414, 1440, 1449, 1453, 1497.)

757. AUDUS, L. J.

The mechanism of auxin action.

Biol. Rev., 1949, 24: 51-93, bibl. 164, illus.

"In a survey of work and views on the nature of auxin action, such as has been attempted in this article, one cannot but be impressed by two broad general features, which stand out from the mass of detail. One is the large number of phenomena for which auxins are directly responsible. The other is the great variety of cell systems on which auxins have been claimed to exert their primary action." There seems to be more evidence for the theory that auxins exert one action on a "master system", than that they exert a series of

discrete actions on a number of cell systems. In view of the serious limitations of most modern theories, it is suggested that a more fundamental knowledge of cell physiology is needed, before further advance can be made.

758. SEXTON, W. A.

The chemistry of plant growth regulators.

Chem. Industr., 1949, No. 1, pp. 9-10.

A short report of a paper read at a meeting of the Society of Chemical Industry held in London in December 1948.

759. TINCKER, M. A. H.

The hormone concept in relation to horticulture.

Sci. Hort., 1949, 9: 106-16, bibl. 25.

A paper, read in September 1946, in which a very brief historical review of physiological investigations is followed by an account of methods of applying growth substances, their application to propagation, some chemical considerations, other responses and applications, parthenocarpy, pre-harvest fruit drop, delay or inhibition of bud growth, selective weed killers, and possible future developments.

760. RAKITIN, JU. V.

The application of growth substances in Russian horticulture. [Russian.]

Nauka i Žiznij (Science and Life), 1948, No. 3, pp. 10-16, illus.

This is a general account of growth substances and their distribution in plant tissues, and the part that Russian workers have played in elucidating their properties, with reference to inducing rooting in cuttings, producing increased yield and parthenocarpic fruits in tomato, parthenocarpy in other plants, preventing pre-harvest fruit drop, premature fall of cotton capsules, seed treatment to increase yield, spraying to increase seed production, delaying flowering to avoid frost damage, and increasing rate of growth in citrus also to avoid frost damage. Brief reference is also made to the use of growth substances to obviate biennial bearing and to destroy weeds.

761. v. HAUSEN, S. S.

On the role of growth substances in higher plants.

Reprinted from *Physiol. Plant.*, 1948, 1: 85-94, bibl. 14.

By simultaneous administration of several growth substances additional growth response was obtained on pea plants whose cotyledons were removed 4-5 days after sowing, and which were grown in light. Those additions were, nevertheless, unable to produce plants comparable with plants normally grown. Most of the factors of the vitamin B complex, biotin, yeast extract and vitamin C, showed growth-promoting capacity. The strongest growth-promoting effect was obtained by vitamin C, which alone caused flowering in cotyledonless plants. [Author's summary.]—Biochemical Institute, Helsinki.

762. STEINER, M.

Ein Beitrag zur Konstitutionsspezifität der Heterauxinwirkung. (The structural specificity of the action of heterauxin.)

Planta, 1948, 36: 130-53, bibl. 34.

(1) In connexion with problems of the structural

specificity of indole-3-acetic acid some new substances prepared by H. Binder (1938) have been examined in the growth substance test. N-acetyl-indole-3-acetonitrile, benzyl cyanide and o-amino-phenyl-acetic acid were found to be active. (2) The results show that the activated methylene group in the side chain of heteroauxin should probably be regarded as a necessary, though in itself not a sufficient, condition for hormone action. (3) Certain findings suggest the possibility that acid nitriles as such possess hormone activity, independent of their saponification to acids. (4) Some basic questions of technique and of the evaluation of test results for the comparison of different chemical substances are briefly discussed. [Abbreviated translation of author's summary.]—Göttingen University.

763. CARLO, P., DUFRENOY, J., AND SAH, P.
Effects of various chemicals as growth regulators.

Abstr. in *Phytopathology*, 1948, 38: 913-14.

Various fungistatic substances, and notably vitamin K, show properties of growth-regulating hormones at concentrations of from 1 to 100 p.p.m.

764. FERRI, M. G., AND LEX, A.
Stomatal behaviour as influenced by treatment with β -naphthoxyacetic acid.
Contr. Boyce Thompson Inst., 1948, 15: 283-90, bibl. 10.

The growth substance, β -naphthoxyacetic acid, was found to cause stomatal closure on leaves of *Tropaeolum majus*, which could be seen either directly by microscopic observation, or indirectly by the measurement of transpiration rate and the rate of gaseous infiltration. In treated plants the stomatal openings did not fluctuate with environmental conditions, but remained almost closed.

765. TANG, Y. W., AND BONNER, J.
The enzymatic inactivation of indole acetic acid. II. The physiology of the enzyme.
Amer. J. Bot., 1948, 35: 570-8, bibl. 26.

An enzyme capable of inactivating indoleacetic acid has been found in etiolated pea seedlings, and in the roots of green and etiolated peas. An inhibitor of this enzyme also occurs in all pea tissue. As light promotes the formation of the inhibitor, the inactivating enzyme is not found in green tissue. Further tests with lettuce, cabbage, carrot, spinach and *Avena* confirm the fact that this enzyme is present in roots and etiolated tissue, but not in green leaves. Two possible roles played by the enzyme are suggested: (1) In etiolated shoots, light inactivation of auxin does not occur, so enzyme inactivation is entirely responsible for controlling the auxin level; (2) In roots, the enzyme may act as a protective mechanism, by which the inhibiting effect of auxin on root growth is kept at a minimum.—California Institute of Technology, Pasadena.

766. RAADTS, E.
Über den Einfluss der Askorbinsäure auf die Auxinaktivierung. (The influence of ascorbic acid on the activation of auxin.)
Planta, 1948, 36: 103-30, bibl. 13.

In the test [*Avena* coleoptile cylinder] ascorbic acid occurs in its oxidized form, i.e. dehydroascorbic acid, and, as a redox system, enters oxidatively into the

growth process. Probably, it influences indirectly the transformation of the inactive growth substance into active auxin. [Translation from author's summary.]—Münster University.

767. RAADTS, E., AND SÖDING, H.
Über den Einfluss der Askorbinsäure auf die Auxinaktivierung. (The influence of ascorbic acid on the activation of auxin.)
Reprinted from *Naturwiss.*, 1947, 34: 11: 344-(?)6, bibl. 4.

Using Funke's very sensitive cylinder test—an isolated cylinder is cut out of the *Avena* coleoptile the day before the test—the authors found that dehydroascorbic acid stimulates the growth of the seedling by activating the auxin precursor at an early stage. The intensity of the reaction varies according to the season.—Hamburg University.

768. BACHOFER, C. S.
Histological responses of bean plants to alpha-naphthyl methyl acetate.
Bot. Gaz., 1948, 110: 119-38, bibl. 10, illus.

In a study of the tumour and root formation induced in the red kidney bean by alpha-naphthyl methyl acetate, this growth substance was found to be less potent than 2,4-D, and the pattern of tumour growth different. Histological responses occurred chiefly in the endodermis, phloem, cambium, xylem, rays and pith, and the production of considerable wood was characteristic. Root formation on the greatly expanded part of the tumour appeared to be independent of the concentration of growth substance, whereas lower down the stem it was induced more readily by a 3% than by a 1.5% concentration.

769. LASNIER, G.
Sur l'hormone végétale anti-abscissive, l'acide naphthalène-acétique. (The anti-abscission plant hormone, naphthaleneacetic acid.)
Rev. d'Oka, 1948, 22: 201-12, bibl. 59.

A survey of the work that has been done on naphthaleneacetic acid and its amide salt, especially in connexion with the control of pre-harvest drop. Its possible applications in the prevention of storage scald of apples, improvement of fruit colour, and prolonging the life of flowers are also considered, and various theories of the physiological action of the hormone in preventing abscission are discussed. [Vyvyan's work is not mentioned either in the text or in the long bibliography.]

770. LEOPOLD, A. C., AND THIMANN, K. V.
Auxin and flower initiation.
Science, 1948, 108: 664, bibl. 3.

The recent note by Green and Fuller on the delay of flowering in petunias by treatment with auxin solutions raises the question whether their effects are specifically exerted on flower initiation. The authors report their work in which auxin treatment had an inhibitory effect on vegetative buds of barley. In addition it is reported that low concentrations, which produced such a vegetative inhibition, definitely increased the number of flower primordia in flowering plants. High concentrations reduced the number of flower primordia. This suggests a parallelism with the known effect of auxins in promoting flowering in the pineapple. The ability

of low concentrations of auxin to increase the number of flower primordia indicates that auxins may not be acting simply in opposition to flowering.

771. GALSTON, A. W., AND HAND, M. E.
Studies on the physiology of light action.
I. Auxin and the light inhibition of growth.
Amer. J. Bot., 1949, 36: 85-94, bibl. 36, illus.

When subterminal sections of etiolated pea epicotyl are excised and grown in aqueous media, their growth is dependent upon auxin concentration. However, at any given auxin level, white light decreases the amount of growth produced. This decrease is not due to differences in auxin content between darkened and illuminated tissues, but rather to a light-induced differential response to auxin. Very brief exposures to light before, during, or after auxin treatment are sufficient to cause marked reductions in growth. It is suggested that a non-auxin system is responsible for the light growth inhibition. [Authors' summary.]—California Institute of Technology, Pasadena.

772. HILDEBRANDT, A. C., AND RIKER, A. J.
The influence of various carbon compounds on the growth of marigold, Paris daisy, periwinkle, sunflower and tobacco tissue *in vitro*.
Amer. J. Bot., 1949, 36: 74-85, bibl. 15, illus.

The effect of sugars and polysaccharides, organic acids and alcohols was studied.

773. LARSEN, P.
Conversion of indole acetaldehyde to indole-acetic acid in excised coleoptiles and in coleoptile juice.
Amer. J. Bot., 1949, 36: 32-41, bibl. 14.

It is shown that indole acetaldehyde, a substance previously found to be active in the avena test, can be converted to indoleacetic acid in excised coleoptile sections, crushed coleoptiles and coleoptile juice. Boiled coleoptile juice failed to bring about the conversion, so it is concluded that this is effected by an enzyme system in the coleoptiles. Although these experiments carried out at the California Institute of Technology, Pasadena, did not prove that indole acetaldehyde itself is completely inactive, the results indicate that it is to be considered a precursor of indoleacetic acid rather than a directly active growth substance.

774. GALSTON, A. W.
Adenine as a growth factor for etiolated peas and its relation to the thermal inactivation of growth.

Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 809.

Subterminal sections of etiolated pea epicotyls will grow rapidly in aqueous media at 25° C. if they are supplied with sucrose and auxin. Raising the temperature to 35° C. causes a sharp decrease in the growth rate. This temperature inhibition of growth may be largely prevented by adding 10 γ /c.c. of adenine to the medium. Since the growth stimulation produced by adenine at 25° C. is much less than that produced at 35° C. it is concluded that adenine synthesis is decreased at the higher temperature. It is greatly increased, however, by exposure of etiolated pea epicotyls to

500 f.c. of light for 1 week. Adenine applied at 25° C. may encourage growth of leaf buds and initiation of root primordia.—California Institute of Technology, Pasadena.

775. DUFRENOY, J., AND PRATT, R.
Responses of cuttings, seeds, and flowers to dithiobiuret.
Science, 1948, 108: 715-16, bibl. 3.

A short report presenting some observations on the response of vine cuttings, germinating seeds and cut flowers to dithiobiuret, called DTB.

776. KONIS, E.
On germination inhibitors. VI. The inhibiting action of leaf-saps on germination and growth.
Palest. J. Bot. (J.), 1947, 4: 77-85, bibl. 18
[received 1949].

The leaf saps of 32 Palestine plant species, wild and cultivated, were tested for germination and growth inhibition, with the following results: All tested leaf saps inhibit germination and seedling growth. When undiluted the inhibition is complete. With increasing dilution the inhibitory effect is weakened. They have, however, to be diluted tenfold in order to eliminate the germination inhibition entirely. The inhibition of root growth surpasses that of germination and disappears at dilutions of 1:25—1:50 only. The inhibitory action of different plants varies: the strongest inhibition is caused by *Feijoa*, *Punica*, *Phragmites*, *Lycopus*, beetroot, carrot and parsley, the weakest by *Typha*, *Lippia* and garden sorrel. The effect of osmotic pressure of the saps on the inhibition is of secondary importance, while that of acidity is negligible. [From author's summary.]

777. BARTON, L. V., AND SOLT, M. L.
Growth inhibitors in seeds.
Contr. Boyce Thompson Inst., 1948, 15: 259-78, bibl. 19, illus.

Substances that inhibit enzyme activity and the germination of seeds are known to be widely distributed in plant fruits and seeds. Experiments were undertaken at the Boyce Thompson Institute to determine whether the presence of such an inhibitor in seeds was related to dormancy. Extracts were made of dormant and non-dormant seeds, and their effect on the growth of wheat roots in solution was taken as a measure of the potency of the growth inhibitor. Seeds of *Sorbus aucuparia*, *Berberis thunbergii* and lettuce were extracted and tested at different stages of the after-ripening process. Although in most cases the inhibiting activity was less as dormancy decreased, no definite relationship was shown between the two. Treatment of the extracts with thiourea, which is known to break the dormancy of lettuce seeds, gave indications that the inhibitor was inactivated. Extracts of non-dormant seeds of wheat, barley, soybean, eggplant and tobacco also inhibited the growth of wheat roots. These results have led to the conclusion that dormancy is not imposed solely by the presence of a substance soluble in water and deleterious to the growth of wheat roots in solution. There may, however, be other types of substances, such as those which might be removed by long leaching, causing failure to germinate.

Propagation.

778. LAWRENCE, W. J. C.

Recent work with seed and potting composts.
Sci. Hort., 1949, 9: 29-34.

This paper, read in September 1946, aims at presenting some facts regarding pot-plant cultivation, as ascertained at the John Innes Horticultural Institution, London, and at arousing horticulturists to the need for securing full nutrition, and so better crops, under glass. The author estimates "that not 1 in 30 commercially raised pot plants has an adequate diet". [See also *H.A.*, 19: 689.]

779. BATEMAN, A. J.

The contamination of seed.

Farming, 1949, 3: 106-9, 118, illus.

A popular article in which the author discusses the ways in which contamination can arise and how it can be kept within bounds. The distinction between stock and commercial seed is stressed.

780. HARGRAVE, P. D.

Vegetative propagation from the standpoint of plant anatomy.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 22-4, bibl. 3.

An introductory review to a discussion on plant propagation. An attempt is made to relate plant anatomy to vegetative propagation. Physiology as it relates to anatomy and propagation is not considered.

781. HILTON, R. J.

Inert materials as media for vegetative propagation.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 30-1.

Mainly concerned with vermiculite. The advantages of the heat-treated mica product [vermiculite] are that (1) it is less than one-sixth as heavy as sand or gravel in the dry state, and hence may be handled, stored, fumigated or heat-disinfected with greater ease than sand; (2) it is very much more water-retentive than sand, hence requires less labour when used in the cutting benches. On the debit side vermiculite is more expensive than sand and gives more trouble than sand if it once gets infected with damping-off organisms.

782. KRUYT, W.

De invloed van groeistoffen, vitamineen, traumatinzuur, aethyleenchlorhydrine en warm water op het enten van enkele sier- teelt-gewassen. (The influence of growth substances, vitamins, traumatic acid, ethylene chlorhydrin and hot water on grafting certain ornamental plants.)

Nederl. dendrol. Veren. Jaarb., 1947, 16e: 83-109, bibl. 46, illus., being *Meded. "De Proeftuin" te Boskoop* 3a.

Work carried out at the Trial Gardens, Boskoop, indicate that it is possible to hasten and strengthen the union of certain conifer grafts by applying indoleacetic acid in lanolin paste to the heel of the scion. *Picea abies* responded best to a 1%, and *Juniperus chinensis* to a 0.5% concentration. Growth substances had no beneficial effect on the healing of veneer grafts of rhododendron species, applied either as pastes or solutions. Callus formation, however, was markedly

increased by hot water treatment. The suggested explanation is that the stimulation of the terminal buds by hot water encourages the production of natural hormones. Immersion for 2 minutes in water at 53° C. gave the same effect as immersion for 30 minutes in water at 40° C., but the latter treatment is recommended as safer for commercial use. The immersion of scions in ethylene chlorhydrin solution gave good results, but not exposure to the vapour. Treatments with vitamin B₁ and glucose solution were ineffective, but yeast extract and the potassium salt of traumatic acid were slightly beneficial. The author emphasizes the need for a better understanding of the physiology of the material before the value of such results can be estimated.

783. BUSTINZA LACHONDO, F., AND CABELLERO LÓPEZ, A.

Contribución al estudio de la influencia de los antibióticos en la germinación de las semillas. (The effect of antibiotics on the germination of seeds.) [English summary 1 p.]

An. Jard. bot. Madrid, 1946, 7: 177-96, illus.

The effect of penicillin salts, patulin, cysteine and furacin on the germination of seeds of wheat, lettuce and radish was investigated. The amorphous calcium and sodium salts of penicillin were found to inhibit germination, but the potassium crystalline salt did not. There are indications that this inhibition is due to phenylacetic acid rather than to penicillin. The inhibiting effect of patulin on the germination of radish seed is counteracted by the addition of a weak solution of cysteine. Patulin and furacin, however, are synergistic in inhibiting germination of lettuce seed.

784. HOFER, J.

Die Wurzelbildungsmethode und ihre Anwendung zur Saatgutbeurteilung. (The evaluation of root development in seed testing.)
Bodenkultur, 1948, 2: 161-83, bibl. 15.

Germination capacity is not a sufficient indication of the vitality of a seed sample. Therefore a method has been worked out which takes root development into account as well. Briefly: the seed is placed in glass dishes in sterile sand, the bottom layer of which is blackened by an admixture of charcoal. Through the transparent bottom of the glass dish the vigour of root development is estimated at certain intervals in comparison with photographs of standard samples. Further, the sprouts are counted that have pierced a layer of sand of a given thickness within a given time. The technique has been used successfully at an Austrian seed testing station in the case of cereals; it needs further development for its application to other seeds.—*Hochschule f. Bodenkultur*, Vienna.

Nutrition.

785. KATZNELSON, H., LOCHHEAD, A. G., AND TIMONIN, M. I.

Soil microorganisms and the rhizosphere.
Bot. Rev., 1948, 14: 543-87, bibl. 140.

This study of the interaction of plant roots and the micro-organisms in the soil in contact with them contributes considerably to an understanding of many

plant reactions to soil treatment and feeding and to problems of root rot control. It has been shown, for instance, that the addition of dried blood or acetic acid to soil infected with strawberry root rot will result in a favourable alteration of the bacterial equilibrium, and allow healthy root growth. Cases of resistance to soil-borne diseases in flax and cotton, due to the selective action of root excretions or carbohydrate content of the roots on the soil microflora, are cited, and the practical value of seed inoculation and bacterial fertilizers is discussed.—Division of Bacteriology and Dairy Research, Department of Agriculture, Ottawa.

786. BERTRAND, G.

Sur la recherche de traces d'éléments dans les organes des plantes et des animaux. (Determination of trace elements in plant and animal tissue.)

Analyst. Chim. Acta, 1948, **2**: 770-81, bibl. 20.

Means are discussed by which inaccuracies, due to losses and gains of trace elements, can be avoided during ashing or mineral extraction of organic matter.

787. GERRETSEN, F. C.

*On the use of *Aspergillus niger* for the determination of plant nutrients in the soil.*

Analyst. Chim. Acta, 1948, **2**: 782-92, bibl. 9, illus.

The use of *Aspergillus niger* is recognized as a cheap and rapid method of estimating certain plant nutrients in the soil, but the technique as used by Niklas had many shortcomings. An optimum culture solution has now been developed by the author, and a new strain of *Aspergillus niger* isolated, by means of which the accuracy of determination is equal to that achieved by chemical methods. This method was used during the war at the Institute of Soil Research, Groningen, for potassium, phosphate and copper estimations, and experiments indicate that it will soon be suitable for estimations of magnesium and zinc also.

788. MULDER, E. G.

The microbiological estimation of copper, magnesium and molybdenum in soil and plant material.

Analyst. Chim. Acta, 1948, **2**: 793-800, bibl. 4.

The microbiological method of estimating copper, magnesium and molybdenum, using *Aspergillus niger*, is described. The trace element requirements of *Aspergillus niger* are very low, so that amounts of copper and molybdenum can be estimated that are too small to be detected chemically. This method has another advantage, in that estimation of an element is possible without separating it from other compounds, thus much time is saved.—Agricultural Experiment Station and Institute for Soil Research, Groningen.

789. RAMEAU, J. T. L. B., REITH, J. F., AND DEYS, W. B.

Some investigations about the microdetermination of lead in plant material.

Analyst. Chim. Acta, 1948, **2**: 823-30, bibl. 10.

The use of "copper slag flour" to overcome copper deficiency involves the risk of raising the lead content of crops to a dangerous degree, for the product contains much lead impurity. "The photometric determination of traces of lead in plant material by means of dithizone is discussed and described in detail. The method is rapid and suitable for serial analysis."

790. BROWN, J. G., LILLELAND, O., AND JACKSON, R. K.

The determination of calcium and magnesium in leaves using flame methods and quartz spectrophotometer.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 1-6, bibl. 6.

From tabulated comparison of results of photometric and chemical analysis of leaves the conclusion is reached that the photometric method is accurate and not influenced by the varying composition of the leaf material. Its chief advantage is speed, viz. 4 minutes as against 20 minutes with about equal degrees of technical skill needed in each case.—Davis, Calif.

791. TOTH, S. J., AND OTHERS.

Rapid quantitative determination of eight mineral elements in plant tissue by a systematic procedure involving use of a flame photometer.

Soil Sci., 1948, **66**: 459-66, bibl. 8.

A rapid and systematic procedure for the quantitative estimations of Ca, Na, K, Mg, Fe, Mn, P, and S in plant tissue has been developed. The methods are simple in operation and reliable, and the eight elements can be determined on samples of 1 to 2 g.

792. LYND, J. Q., AND TURK, L. M.

Permanent plastic standards for rapid soil and plant tissue testing.

J. Amer. Soc. Agron., 1948, **40**: 940-1.

This study was undertaken in an attempt to prepare permanent plastic standards which would combine the desirable qualities of the standard determinations with the permanence and durability of lithograph colours. Standards have been prepared for determinations of phosphorus, potassium, magnesium and calcium, that are convenient and simple to use and especially adapted for field testing.

793. ROACH, W. A.

Plant injection methods.

Sci. Hort., 1949, **9**: 55-61, illus.

A general description of the methods used by the author and his team at East Malling, for diagnosing mineral deficiencies in plants. This is followed by some examples of the practical application of the methods and their value in advisory work.

794. NICHOLAS, D. J. D.

Rapid tissue tests for mineral nutrients in plants.

Sci. Hort., 1949, **9**: 50-4, bibl. 9.

A technique, devised at Long Ashton, is described which has proved invaluable for rapid diagnostic work and has played an important part in resolving nutrient disorders in farm and garden crops. It is an early diagnostic method and can in some instances be used before the onset of visual signs. It is particularly useful when the visual symptoms are not well defined or are masked by damage caused by fungi, insects, or virus diseases. This paper was read in September 1946.

Breeding and genetics.

(See also 1404, 1430, 1586, 1653.)

795. CRANE, M. B.

Genetics applied to horticulture.

Sci. Hort., 1949, **9**: 96-105, bibl. 16, illus.

The author discusses mutations, bud sports and chimaeras, chromosome doubling, triploids, species crosses, sterility problems, genetics and plant identification, variety synonyms, physiological grouping, hybrid vigour and problems of crop uniformity. The paper was read in September 1946.

796. LAIBACH, F.

Arabidopsis thaliana (L.) Heynh. als Objekt für genetische und entwicklungsphysiologische Untersuchungen. (*A. thaliana* as a suitable material for investigations in genetics and developmental physiology.)

Reprinted from *Bot. Arch.*, 1943, 44: 439-55, bibl. 10 [received 1949].

For reasons stated this plant lends itself particularly well to a study of the causes of flower bud formation.—University Frankfurt a.M.

797. HUNTER, A. W. S.

Colchicine in horticultural plant breeding. (*Mim.*) *Rep. Proc. W. Canad. Soc. Hort.*, 3rd annu. Meet., 1947, pp. 46-8.

A popular account of colchicine-induced polyploidy and its application in the production of new horticultural varieties.

798. FRAHM-LELIVELD, J. A.

Polyploidie bij planten door chemische verbindingen. (The induction of polyploidy in plants by chemical means.) [English summary.]

Chron. Nat., 1948, 104: 321-34, bibl. 5.

An extensive survey of the work done on the artificial induction of polyploidy, since the discovery of the effect of colchicine in 1937. The following aspects of the subject are discussed:—(1) Morphological and cytological changes occurring when polyploidy is induced, (2) tumour formation, (3) agents other than colchicine, (4) the chemical, physical and physiological reactions involved, (5) effect of chemical agents on nucleus and cytoplasm, (6) combination of agents, (7) the ecological and physiological value of polyploid races, (8) the value of polyploidy in plant breeding. The author suggests that lower concentrations of colchicine than are generally considered necessary could be used with great advantage, if a dispersing agent were used.

799. TSCHERMAK-SEYSENEG, E.

Künstlich bewirkte Samenbildung ohne Befruchtung. (Artificially induced seed development in the absence of pollination.)

Bodenkultur, 1948, 2: 1-9, bibl. 16.

In this article the author, one of the re-discoverers of the Mendelian laws, comes forward with a new discovery which may be of great importance in plant breeding: the induction of parthenogenetic seeds by applying a stimulus to the stigma. The plants of the daughter generation, though diploid, show all the characters of the mother. There is no segregation in F_2 after hybridization. The stimulus to the stigma may be exerted by foreign pollen, certain flour preparations, talcum powder and other materials, the chief requisite probably being the gradual desiccation of the stigma and consequently of the entire sex apparatus. It seems that parthenogenesis can be induced more

easily in families in which it has been observed to occur spontaneously, for instance in *Rosaceae*—especially the *Pomaceae*—*Cucurbitaceae*, *Papaveraceae*, *Solanaceae* (e.g. *Nicotiana tabacum*) and vine. It is anticipated that this new method of stimulation will be particularly useful in flower breeding and in fruit growing. A full account of the experiments and a discussion of the results was due to appear in *Biologia Generalis*, 1948.

Machinery.

(See also 887, 1334.)

800. ELMS, C. E.

Recent developments in horticultural machinery [in Britain].

Sci. Hort., 1949, 9: 35-44.

A paper read in September 1946 which deals with the subject from the standpoint of soil preparation, rotary tillage, manure distribution, seed drills and transplanters, weed control, potato planting and lifting.

801. HOARE, E. R.

The type of machine the grower needs.

Grower, 1949, 31: 198-9, illus.

The writer, director of the horticultural section of the National Institute of Agricultural Engineering, specifies the type of tractor needed for horticultural work in Britain—a type not yet perfected.

802. ANDAL, M. E.

Use of power machinery in bush land improvement in northeastern Saskatchewan.

Fmr's Bull. Canad. Dep. Agric. 153, 1948, being *Publ. 814*, pp. 13, illus.

Includes descriptions of the equipment used (tractors, cutters, pliers, bulldozers, etc.) and details of the methods adopted and their cost.

803. BROWN, P. H.

Some reflections on machinery for vegetable production [in Britain].

Sci. Hort., 1949, 9: 132-6.

Under present conditions three different classes of vegetable producers are emerging: (a) large-scale vegetable growers—intensive producers on extensive lines of a full range of vegetable and salad crops; (b) market gardeners—intensive producers on a small scale of salad and special vegetable crops, flowers and other "luxury" and out-of-season crops, making maximum use of glasshouses, frames, cloches and other structures; (c) farmer-producers—extensive producers of bulky types of vegetables in the farm rotation. It is desirable that machinery should be developed to meet the requirements of these three classes of producer, whose needs differ, more particularly in respect of machine size and output rather than in type of machine. The objects of mechanization, the mechanical requirements of classes (a), (b) and (c), and some mechanical aids in market presentation are discussed.

804. BOMFORD, D. R.

Mechanized transplanting.

Agriculture, 1949, 55: 490-3, illus.

The pros and cons of the transplanting machine for horticultural crops are discussed, as well as speed of planting and the problems created by widely and

closely spaced crops. Machine transplanting has reached a stage at which it is sound practice for almost any large-scale vegetable production unit to adopt it, but with most crops there are irksome limitations which urgently require more development work. Unfortunately little or nothing has been done to fulfil the requirements of the small-scale horticulturist.

805. HOARE, E. R.

Fruit plantation machinery.

Farming, 1949, 3: 114-18, illus.

A short historical note on the evolution of fruit growing in Britain is followed by discussions on some technical problems in applying sprays to tree fruits, the transport of fruit from orchard to packing station, and some mechanical problems of the soft-fruit grower such as cultivation, spraying, dusting, and nicotine gassing. Mention is made of a power-driven pruning-knife. A hint is given of some changes that may come about in spraying and other techniques as a result of research and high labour costs.

806. KEARNS, H. G. H., AND DOREY, O. G.

Some reflections on machinery for fruit production [in Britain].

Sci. Hort., 1949, 9: 127-31.

An article based on a discussion opened by the authors at a London conference in October 1947. The first part discusses manufacturing problems and the second the needs of the grower. Perhaps the most outstanding problem awaiting solution is the mechanical prevention of frost damage. Among the implements for which fruit growers are still waiting are: a good manure distributor, an alternative to the gang-mower for use on stony ground, machinery for collecting and disposing of prunings, improved picking-ladders, etc.

807. BROWN, C. A. C., AND GOLDRING, E. W.

The application of electricity to horticulture.

J. Inst. elect. Engrs., 1948, 95, Pt. II, pp. 423-33, bibl. 11, illus.

This paper, of which the following is the authors' summary, is followed by an interesting 4-page report of a discussion on the subject. The scale of growing covered by commercial market gardening and nursery production, and by amateur gardening, offers wide scope for the application of electricity in ways which contribute materially to the prosecution of these activities. Such applications are regarded in two main categories: those concerned with actual growth processes, e.g. soil warming, space heating and illumination, and those for ancillary purposes such as soil sterilization, pest destruction and water pumping. Soil warming is now largely effected by the low voltage transformer-fed system and is applied to hotbeds, propagating beds and benches, to cloches, and to beds and borders in glasshouses. It provides an economical way of producing localized warmth in such cases and by so doing can sometimes result in other economies, e.g. in space heating. Electrical space heating of glasshouses must be handled very carefully and at present can be applied with justification only in certain classes of glasshouse work, principally in the high-grade propagating house and the amateur's greenhouse. Electrical methods are already improving the technique and simplifying the operation of various sterilizing processes, both of soil and of plants, and

certain possibilities of future developments are discussed. Electricity also offers considerable mechanical aid in the form of water pumping, ventilation, lawn-mowing, etc., and there is a distinct possibility that methods will be developed for the successful operation of small-plot cultivating appliances.

Soilless culture.

(See also 1416, 1424, 1643.)

808. KING, J. H.

Soilless culture.

North. Gdr., 1949, 3: 9-13.

The author considers that although soilless cultivation is not at the moment a commercial proposition it has great possibilities in the near future. Among definite successes with the method he places:—the rooting of both soft and hard cuttings, the growth of lettuces through the winter, the continual growth of such plants as primulas, fuchsias, geraniums, cyclamen, gloxinias, chrysanthemums, veronicas and many other flowering plants which will thrive and produce large flowers of rich colour lasting a long time. He describes the methods which he has found successful, giving formulæ and means of determining nutrient deficiencies.

809. WITHROW, R. B., AND WITHROW, A. P.

Nutriculture [soilless culture].

S.C. Purdue agric. Exp. Stat. 328, 1948, pp. 60, bibl. 21.

The circular addresses itself chiefly to scientifically educated individuals who are "interested in the commercial production of crops by nutriculture, either in the greenhouse or outdoors in subtropical or tropical locations". At the outset extravagant claims are repudiated and it is emphasized that nutriculture methods "cannot be utilized under circumstances which do not allow for good soil production, except where the soil itself is the limiting factor". The presentation of the subject matter is attractive and concise. While actual crop production is not dealt with at all, the 60 pages of small print contain a great deal of information on the more fundamental aspects of the method such as aggregates, nutrient solution chemicals, chemical testing, etc., and a discussion of the special merits and disadvantages of the different systems of nutriculture in use.

810. TEMPLEMAN, W. G.

Soilless culture.

Sci. Hort., 1949, 9: 62-6, bibl. 18.

A description of the two principal methods used (solution culture, and sand, or aggregate, culture) is followed by two formulae for making nutrient solutions and a résumé of the advantages and disadvantages of soilless culture. This paper was read in September 1946.

811. DE LA BORBOLLA Y ALCALÁ, J. M. R., AND CAMOYÁN DE R. DE LA BORBOLLA, M.

La preparacion de soluciones nutritivas para investigaciones de nutricion vegetal. (The preparation of nutrient solutions for the study of plant nutrition.)

Anal. Inst. españ. Edafol. Ecol. Fisiol. veg., 1948, 7: 365-402, bibl. 44.

The authors describe the composition and preparation

of some much used solutions, and discuss in detail problems such as the purification of salts, control of osmotic pressure, and the maintenance of a constant pH value. The development of the experimental technique is reviewed, from the time of the early investigators, such as Woodward and Sachs, to the invention of spectrographic analysis.

Glasshouse problems.

(See also 746-756, 778, 822, 948, 949, 1161.)

812. VAN DEN MUIZENBERG, E. W. B.

De betekenis van dunstmatige belichting in de tuinbouw. (The significance of artificial illumination in horticulture.)

Meded. Dir. Tuinb., 1949, 12: 16-20, bib. 8.

The use of artificial illumination in greenhouses with particular reference to modifying "day-length" is described. Fluorescent and incandescent lighting are compared and the costs of installing and running the systems are tabulated. Fluorescent lighting is the more expensive to install but its use is preferable in certain cases, e.g. raising early tomato and cucumber seedlings.

813. WATT, J. H.

Spray equipment for glasshouses.

N.Z. J. Agric., 1948, 77: 357-9, illus.

The importance of systematic measures for controlling pests and diseases of glasshouse crops is pointed out. Types of equipment for spraying and dusting are described and illustrated.

814. HOFFMANN, G. C.

Das Tempo-gewächshaus. (The Tempo glasshouse.)

Ceres, Hamburg, 1948, 1: 12: 15-16.

A description is given of a type of light glasshouse which can be easily assembled on the spot and is economical in materials. Its sides consist of lights of ordinary frame size. If erected on planks the house can be moved without difficulty. Heating may be installed.

815. GRAY, H. E.

Summer cooling of greenhouses.

Bull. N.Y. St. Flower Growers 33, 1948, p. 8, illus.

Three methods of controlling high summer temperatures in glasshouses were studied at Cornell University. Water sprayed over the roof was found to be more satisfactory than shade paint or water atomized in the house. It gave greater temperature reduction, had little effect on the light intensity inside the house, and could be regulated according to changing outdoor conditions. Atomized water in the house gave no significant reduction in temperature when the ventilators were open.

816. SEELEY, J. G.

Automatic watering of potted plants.

Proc. Amer. Soc. hort. Sci., 1948, 51: 596-604, bibl. 6.

Injection, constant water level, and copper tube automatic methods of watering of pot plants are described. Plants watered by these three methods were equal in quality or better than those which were

surface watered. Uniform soil moisture conditions for the growth of pot plants can be maintained automatically with a minimum of labour by means of the constant water level method. This article is concerned mainly with observations at Ithaca on the constant water level method. The method in general consists of putting the pot plants on a layer of sand or plunging the pots in sand in a water-tight bench with a constant water level 1 inch below the pot. Replacement of water movement is by capillarity. Notes are given on the injection method and the copper tube method. All proved successful.

Horticultural practice.

817. CULLEN, E.

Aerial top-dressing is still in experimental stage.

N.Z. J. Agric., 1948, 77: 323.

Some preliminary experiments with aerial top-dressing have already been made by the New Zealand Department of Agriculture for the spreading of small quantities of materials such as copper sulphate and cobalt. Another experiment has been planned to obtain further information of the possibility of aerial top-dressing.

818. LACOMBE, R.

Épandage des engrains en solution. (The application of manures in liquid form.)

Prog. agric. vitic., 1949, 131: 60-5

The advantages of applying fertilizers in liquid form are stated to be: (1) the fertilizer can be applied at a relatively high concentration. At 5% no damage to crops has been observed and 10% nitrogen fertilizers have given excellent results. (2) The fertilizers are readily fixed and their distribution in the upper layers of soil is uniform. (3) The solutions have no corrosive action on pipes. Results obtained are discussed, and two types of injector described, one for manual use, the other acting by pressure from a spraying machine.

819. SCHMIDT, C. M., JAMESON, D. H., AND SPECHT, J. G.

Bibliography of literature on potash as a plant nutrient.

(Mim. Publ.) *Amer. Potash Inst.*, 1948, pp. 85.

A supplement to earlier bibliographies issued in 1940, 1941, 1946 and 1947. It is more than a bibliography, since it gives an abstract of each paper mentioned. The subject is treated under 5 heads: crops (including horticultural and plantation crops, temperate, tropical and subtropical), crop analysis, fertilizers, potash, and soils.

820. ARLAND, A.

Schlamm als Düngemittel. (Manuring with ooze from lake and river beds.)

Ceres, Hamburg, 1948, 1: 11: 13-14.

A brief report of manurial trials with ooze from river beds in the Leipzig area. With lettuce, the material worked in shallowly at the rate of 250 quintals, 750 q., and 750 q. + 10 q. lime per hectare produced increases in yield of 32%, 80%, and 82% respectively. The pH value of the ooze was 7 and its P and K content was very satisfactory, trace element constituents being still

under investigation. A beneficial effect of the treatment has been recorded also for a number of other vegetables and flowers. Where the presence of injurious substances is suspected, the material should be obtained in autumn and left in the open until spring. The lakes in the province of Brandenburg are considered to be a valuable potential source of ooze.

821. EGGERS, H. W. T.

Laying tile drains.

N.Z. J. Agric., 1948, **77**: 373-4, illus.

Tile drains may be permanent, for they are not subject to blockage by soil subsidence if properly made, but they may become blocked because of faults in laying, inattention to outfall, and the collection of silt in them. The hydraulic principles underlying successful tile draining, and machines for drain construction are described.

822. RHODES, J., AND SKILLMAN, E. E.

Irrigation of horticultural crops [in Britain].

Sci. Hort., 1949, **9**: 137-42.

The subject is considered and discussed from the standpoint of water requirements, the supply of nutrients in irrigation water, the irrigation of (a) open land, (b) glasshouses, and (c) fruit crops.

823. THERON, J. J.

Lysimeter experiments [in S. Africa].

Sci. Bull. S. Afr. Dep. Agric. **288**, being

Agric. Res. Inst. Ser. 16, 1948 (?), pp. 41, bibl. 33, illus.

A series of lysimeter trials are reported which suggest that the re-establishment of vegetation will not contribute materially towards replenishing South Africa's sub-surface water resources, unless transpiration can be very substantially curbed at the same time. The theory is advanced that this curbing of transpiration can be brought about in practice only by re-establishing a type vegetation such as occurs in a grass sward left to itself (ou-veld), which will produce and accumulate sufficient waste material to smother growing plants—as happens when grass is allowed to grow unchecked year after year. The second part of this paper is devoted to experimental data.

824. MCCOOL, M. M.

Studies on pH values of sawdusts and soil-sawdust mixtures.

Contr. Boyce Thompson Inst., 1948, **15**: 279-82, bibl. 3.

The pH value of sawdust taken from different species of trees was found to vary, and the addition of these sawdusts to soil in some cases decreased and in others increased the acidity of the soil. This change of reaction may partially account for the unfavourable results that sometimes follow the addition of sawdust to soils.

825. BOISCHOT, P., AND BARBIER, G.

La sciure de bois comme source d'humus.
(Sawdust as a source of humus.)

C.R. Acad. Agric. Fr., 1948, **34**: 901-2.

Sawdust is of far less value than straw as a source of humus, and because of its slow rate of decomposition it has to be left to ferment in the heap a long time before use.

826. ALBAN, E. K., AND FORD, H. W.
A multiple chamber pressure unit for respiration studies.

Proc. Amer. Soc. hort. Sci., 1948, **52**: 183-6, bibl. 4.

A pressure system measuring 12 samples per test.

Noted.

827.

a ANON.

Delectus seminum quae institutum experiente agrarium in Sofia pro mutua commutatione offert 1947. (List of seed plants grown at the Bulgarian agricultural Institute and offered for exchange 1947.)

Publ. centr. agric. res. Control Inst., Sofia, No. **2012**, 1947, pp. 13.

b ANON.

List of references to boron literature, October-December 1946.

(Mim. *Publ.*) *Amer. Potash Inst.*, 1948, pp. 7.

c BRITISH COUNCIL.

Scientific and Technical Societies in China. (Mim. *Publ.*) *Brit. Coun. Sci. Office, Shanghai*, 1948, pp. 5.

Includes the names and addresses of 33 Chinese societies and their publications, if any.

d BÜNNING, E., HAAG, L., AND TIMMERMANN, G. Weitere Untersuchungen über die formative Wirkung des Lichtes und mechanischer Reize auf Pflanzen. (Further investigations on the formative effect of light and mechanical irritation on plants.)

Planta, 1948, **36**: 178-87, bibl. 9.

e ČAĽAHJAN, M. H.

The physiology of plant vernalization. [Russian.]

Uspehi sovremennoi Biologii (Progress in contemporary biology), 1942, **15**: 83-104, bibl. 39 [received 1949].

f CANCELLARA, E.

Sulla terminologia dell'irrigazione. (Irrigation terminology.)

Ann. Fac. Agrar. Portici, 1941/42, **13**: 338-69, illus. [received 1948].

A plea for simplification with many useful examples.

g CAPLIN, S. M., AND STEWARD, F. C.

Effect of coconut milk on the growth of explants from carrot root.

Science, 1948, **108**: 655-7, bibl. 16, illus.

h COHEN, B. (revised by).

The measurement of pH, titratable acidity and oxidation-reduction potentials.

Pure Culture Study of Bacteria, Leaflet IX, 10th edit., Geneva N.Y. 1948, pp. 24, bibl. 16.

i DE COSTER, R.

Hoe werken de groeistoffen ? Algemeen overzicht van de groeiregelande stoffen. (How do growth substances act ? A general review of growth substances.)

Cult. Hand., 1948, **14**: 713-15.

j CROOK, E. M., AND HOLDEN, M. Some factors affecting the extraction of nitrogenous materials from leaves of various species. *Biochem. J.*, 1948, **43**: 181-5, bibl. 7.

k DESSUREAUX, L., AND GODBOUT, E. Thirty-five years of weather records at Sainte-Anne-de-la-Pocatière [Quebec]. *Sci. Agric.*, 1949, **29**: 13-26, bibl. 11, illus.

l FROHBERGER, P.-E. Die Guttationstropfenmethode. Eine Möglichkeit zum eindeutigen Nachweis der Aufnahme und des Transports bestimmter Stoffe durch die Pflanze. (The use of the guttation drop method as a proof of the uptake of certain substances by the plant and their conduction in the plant.) *Höfchen Briefe*, 1948, No. 3, pp. 23-5, bibl. 2.

m GALL, H. J. F. Some effect of 2,4-dichlorophenoxyacetic acid on starch digestion and reducing activity in bean tissue cultures. *Bot. Gaz.*, 1948, **110**: 319-23, bibl. 19, illus.

n GALSTON, A. W. The effect of light on plant response to auxin. Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, **35**: 809.

o HOPP, H. The ecology of earthworms in cropland. *Proc. Soil Sci. Soc. Amer.* 1947, 1948, **12**: 503-7, bibl. 4.

p KOSTOFF (KOSTOV), D. Homozygous translocations obtained in the second generation from material treated with neutrons. [Bulgarian, with English summary 2 pp.] *Ann. Univ. Sofia, Fac. Med.*, 1946, **25**: 711-19. Results of tests on seeds of *Crepis capillaris*, a wayside plant.

q KRAUSE, K. Ankaranın floru. (Flora of Ankara.) [Text in Turkish and German.] *T.C. Yüksek Ziraat Enstitüsü Ankara*, 1937, No. 2, pp. 207, illus. [received 1948].

r KRIBBEN, F. J. Die Injektionsmethode bei Wuchsstoffuntersuchungen. (The application of the injection method in growth hormone investigations.) Reprinted from *Ber. dtsch. bot. Ges.*, 1939, **57**: 526-30, bibl. 2 [received 1949].

s KUCKUCK, H., AND SCHMIDT, M. Zwanzig Jahre Pflanzenzüchtung in Münchenberg. (Twenty years of plant breeding at Münchenberg [Germany].) Reprinted from *Züchter*, 1948, **19**: 129-35.

t LAIBACH, F. Kreuzungen zwischen *Coleus*-arten vom Lang- und Kurztag-typ. (Crossbreeding between *Coleus*-species of a long- and short-day character.) [English summary ½ p.] *FIAT Rep. Off. milit. Govt Germany (U.S.)* **1135**, 1947 (?), pp. 20, bibl. 11.

u LANG, A., AND MELCHERS, G. Über die hemmenden Einfluss der Blätter in der photoperiodischen Reaktion der Pflanzen. (The inhibiting influence of leaves on photoperiodic reaction in plants.) *Naturwiss.*, 1941, **29**: 82-3, bibl. 15 [received 1949].

v MELCHERS, G. Die Blühhormone. (The flowering hormones.) *Ber. Dtsch. bot. Ges.*, 1939, **57**: 29-45, bibl., illus. [received 1949].

w MELCHERS, G., AND CLAES, H. Auslösung von Blütenbildung bei der Langtagpflanze *Hyoscyamus niger* in Kurztagbedingungen durch Hemmung der Atmung in den Dunkelphasen. (Flower formation induced in the long-day plant *Hyoscyamus niger* under short-day conditions by inhibiting respiration in the dark phases [by means of an atmosphere of nitrogen].) *Naturwiss.*, 1943, **31**: 249 [received 1949].

x MORAN, P. A. P. The interpretation of statistical maps. *J. roy. statist. Soc. (Ser. B)*, 1948, **10**: 243-51, bibl. 4.

y NUTTONSON, M. Y. Agroclimatology and crop ecology of Palestine and Transjordan and climatic analogues in the United States. Reprinted from *Geograph. Rev.*, 1947, **37**: 436-56, bibl. 36.

z PHILIPSON, W. R. The ontogeny of the shoot apex in dicotyledons. *Biol. Rev.*, 1949, **24**: 21-50, bibl. 140.

828.

a PIPER, C. S., AND BECKWITH, R. S. A new method for determination of small amounts of molybdenum in plants. *J. Soc. chem. Ind. Lond.*, 1948, **67**: 374-9, bibl. 16.

b PUCHER, G. W., LEAVENWORTH, C. S., AND VICKERY, H. B. Determination of starch in plant tissues. *Analyt. Chem.*, 1948, **20**: 850-3, bibl. 20.

c ROBERTS, W. O. Prevention of mineral deficiency by soaking seed in nutrient solution. *J. agric. Sci.*, 1948, **38**: 458-68, bibl. 29, illus. Positive results on oats.

d SMITH, C. A. B., AND HARTLEY, H. O. The construction of Youden Squares. *J. roy. statist. Soc. (Ser. B)*, 1948, **10**: 262-4.

e SMITH, F. M., SCHRENK, W. G., AND KING, H. H. Spectrographic determination of boron in plant tissue. *Analyt. Chem.*, 1948, **20**: 941-3, bibl. 12.

f STUMPF, P. K. Carbohydrate metabolism in higher plants. I. Pea aldolase. *J. biol. Chem.*, 1948, **176**: 233-41, bibl. 11.

g VISHER, S. S. Freezing temperatures in the United States. *Ecology*, 1944, **25**: 113-17 [received 1949].

h WALDRON, D. R., AND OTHERS.
A study of methods for the determination of sugar in crop plants.
J. Ass. off. agric. Chem. Wash., 1948, 31: 708-14, bibl. 8, being *J. Art. Mich. agric. Exp. Stat.* 946 (n.s.).

i WAYGOOD, E. R.
Adaptation of the method of Lowry and Lopez to the estimation of inorganic and organic phosphate in plant extracts.
Canad. J. Res., 1948, 26, Sec. C, pp. 461-78, bibl. 13.

TREE FRUITS, DECIDUOUS.

General.

(See also 730, 738, 748, 1646, 1647.)

829. HAMBOULLAS, K.
Deciduous fruit growing in Cyprus.
Leaf. (Educ. Ser.) Cyprus Dep. Agric. 20, 1947, pp. 12.
Practical advice on establishing and managing orchards on improved lines. Brief details are given of apple, pear, plum, peach, nectarine, cherry and apricot varieties tried locally and of the rootstocks used for these fruits.

830. HULSHOF, H. J., AND TE VELDHUIS, J. W.
Bodem en fruitteelt in Oost-Gelderland.
(Soils and fruit farming in Eastern Gelderland.) [English summary 8 ll.]
Meded. Dir. Tuinb., 1949, 12: 57-68, bibl. 12.

The importance of a proper knowledge of soil profiles in selecting land for planting fruit in the eastern part of the province of Gelderland is pointed out. Growth differences in established plantations can only be attributed to soil variation. Silty soils along the banks of streams proved to be the most suitable for fruit growing. Observations are recorded for pears and apples.

831. TER PELKWIJK, A. J.
Wijster, een proeftuin voor fruitdragende houtige gewassen. (The Wijster experiment garden for fruit trees.)
Tuinbouw, 1948, 3: 266-7.

An account of the experiment garden at Wijster, a village in the parish of Beilen, Drente province, Holland. It is referred to as a "fruticetum"—a collection of fruiting shrubs with representatives of the genera *Corylus*, *Berberis*, *Ribes*, *Amelanchier*, *Aronia*, *Crataegus*, *Malus*, *Prunus*, *Rosa*, *Rubus*, *Sorbus*, *Cornus* and *Vaccinium*. The *Corylus* (hazel) collection comprises 10 species and varieties and 24 strains. This fruticetum is connected with the Biological Station of which Dr. W. Beyerinck is director.

832. ZANOTTI, L.
La peschicoltura Italiana nei suoi indirizzi tecnici. (Present trends of peach growing in Italy.)
Ital. agric., 1948, 85: 636-43.

Production rose from 700-800 thousand quintals in 1921/23 to 3 millions with 550-600 thousand exported in 1939/40. The dates at which different varieties

j WENDEL, K.
Beiträge zur photometrischen Messung von Chlorophyll-Lösungen. (The photometrical measurement of chlorophyll solutions.)
Planta, 1948, 36: 71-80, bibl. 18.

k WEYLAND, H.
Jüngste Erfahrungen von Knospenmutationen durch Behandlung mit Chemikalien. (Latest observations on bud mutations resulting from chemical treatment.)
Höfchen Briefe, 1948, No. 3, pp. 3-4.

come on the market and the characters of their fruits are discussed, and possible ways in which improvements might be introduced are touched on.

833. MEDOFILO BECERRA, A.
El cultivo de frutales de Tierra Fria en Nuevo Colón (Boyacá). (Cultivation of temperate fruit in Boyacá, Colombia.)
Agric. trop. Bogota, 1948, 4: 11:11-14, illus.
The findings of the survey, carried out by the Zona Técnico Administrativa of Boyacá, of the temperate fruit trees, apples, pears, plums and peaches, growing in the Boyacá district, are discussed. They indicate how the industry could be developed so as to render imports unnecessary in this area, which is very suitable for the cultivation of temperate fruits. The apple is most widely grown, but crops are poor because of bad cultivation, lack of chemical fertilizers and the prevalence of canker. The production of peaches could be greatly increased by the introduction of better varieties suitable for commercial purposes.

834. PREST, R. L.
Fig growing in Queensland.
Qd agric. J., 1948, 67: 332-43, illus.
Commercial fig growing in Queensland is confined to the neighbourhood of Brisbane, but figs are also grown in gardens in many parts of the state. Most of the fruit is used in jam making, but small quantities are marketed fresh. Fig trees thrive on sands, sandy loams, and loams provided these are well drained. Notes are given on botanical characters and classification, and five varieties are briefly described, viz. Adriatic (White Adriatic), Brown Turkey, Brunswick, Cape White and Genoas (black and white). In Queensland the fig is propagated from cuttings made during the dormant season from well-matured wood of the previous season's growth. Advice is given on planting, pruning, cultivation, manuring, harvesting, marketing and control of diseases and pests.

835. CONDIT, I. J.
Figs—facts and figures of 1948.
Econ. Bot., 1948, 2: 403-18, bibl. 6, illus.
The development and present economic state of the fig growing industry in California is discussed, and notes are given on the handling of the crop for the fresh fruit market, drying and canning.—Univ. of California Citrus Exp. Stat., Riverside.

836. HARTMANN, H. T.
The olive industry of California.
Econ. Bot., 1948, 2: 341-62, bibl. 17, illus.

The industry is based primarily on the production of olives for pickling, the production of olive oil being of very secondary importance in California. Unlike the Mediterranean olive plantations, the Californian orchards are grown almost entirely under irrigation. This naturally affects culture; for instance, there is no need for severe pruning to reduce water loss. Experimental evidence has been obtained by the California Agricultural Extension Service that the pruning of bearing olive trees reduces the yield about in proportion to the severity of the pruning, without appreciably increasing fruit size. The regular application of nitrogenous fertilizers, sometimes in the form of liquid ammonia in the irrigation water, has recently become a widespread practice among Californian growers, and is believed to have contributed considerably towards the tremendous increase in yield during the last ten years.

Breeding and varieties.

(See also 789, 827, 1645.)

837. ALDERMAN, W. H.

Fruit breeding—past, present and future.

Proc. Amer. Soc. hort. Sci., 1948, 51: 670-84.

The author discusses the work done at the U.S. and the Canadian research stations since June 1900, notes present trends and makes an estimate of the new varieties of different fruits likely to be produced by these stations in the years 1947-1952. Light is thrown on the length of time required by an outstandingly successful introduction to become very widely accepted by reference to the history of the Delicious apple. "The speed with which it acquired its present fame is considered quite phenomenal, but it was promoted by a modern advertising campaign. . . . How long did it take . . . ? It was introduced over 50 years ago." Interest in particular fruits as shown by breeding projects at different stations in descending order of importance puts the strawberry and apple well ahead of all other fruits, being followed by peach, raspberry, plum, grape, pear, cherry, with apricot and blueberry bringing up the rear. The chief general aims have been to produce fruits showing local adaptability, hardiness, disease and insect resistance, better quality for dessert, culinary or transport purposes, regularity of bearing. The importance of a long pre-introduction period is stressed. The information given in this paper was based on a questionnaire. It ends with a list of the experiment stations in U.S.A. and Canada which maintain active projects in fruit breeding and of the fruits with which they are concerned.

838. SCHMIDT, M.

Erreichte und Erstrebtes in der Obstzüchtung. (Achievements and aims in fruit breeding.)

Reprinted from *Züchter*, 1948, 19: 135-53, bibl. 55.

The author has been in charge of pome and stone fruit breeding at the Erwin Baur Institut, Müncheberg, Germany, since 1934 and of soft fruit breeding since the end of the war. The past and present work is discussed with special reference to breeding for frost resistance, disease resistance and fruit quality. The

breeding of pome and stone fruit rootstocks is included in the problems surveyed.

839. HOUGH, L. F., AND SHAY, J. R.

Breeding for scab resistant apples.

Abstr. in *Phytopathology*, 1949, 39: 10.

The cross susceptible \times *Malus floribunda* gave a ratio of 1 resistant: 1 susceptible, and *M. floribunda* selfed gave a ratio of 3: 1. This indicates that scab resistance in this clone is dominant and controlled principally by a single factor pair for which *M. floribunda* is heterozygous.

840. LESLIE, W. R.

New hardy fruits.

Amer. Fruit Gr., 1949, 69: 1: 18, 35.

New hardy top and small fruit varieties are discussed by the author, who is in charge of the Dominion Experimental Station, Morden, Manitoba.

841. VAN STUIVENBERG, J. H. M. (Editor).

Erst Betuwsse rassenlijst voor fruit. (The first fruit variety list for the Betuwe district [of Holland].)

Publ. N.F.O. (Nederlandse Fruittelers Organisatie), Kring "Rijn en Waal", 1948, pp. 30.

This publication is not intended to supersede the well-known Descriptive Variety List that caters for the whole of Holland, but to supplement it by recommending those varieties that are best suited to the very varied local soil conditions of the Betuwe fruit growing district. This attempt to base recommendations on a local soil survey is a valuable and sound enterprise, although it encounters certain difficulties. For instance the behaviour of many varieties and stocks on certain soil series has not been sufficiently well tested to allow recommendations to be made on this basis, so only those of known performance are included. In this way, many good varieties have been omitted. A chapter is devoted to a description of the soil series of the Betuwe district, and a local soil survey map is appended. The recommendation charts and descriptive notes on varieties are concise and full of information.

842. COMMITTEE OF NOMENCLATURE.

Newer and promising varieties of fruits [for Canadian Prairies].

(Mim.) *Rep. Proc. W. Canad. Soc. Hort., 4th annu. Meet.*, 1948, pp. 36-8.

This third report of the committee includes: apples, Melbac and Brooks No. 14; crabs, Alred and Sundog; raspberry, Dyas and Honeyking (red) and The Honeywood No. 2 (black); strawberry, Glenheart (June-bearing) and Restigouche (ever-bearing); cranberry, Manitou Pembina, *Prunus* hybrid, Prairie Almond. Brief notes are given on the origin and characteristics of each.

843. GRAY, H. E., AND OTHERS.

Frozen fruits and vegetables.

Canad. Fd Ind., 1948, 19: 10: 37-45.

This report by the Fruit and Vegetable Products Research Committee, Ottawa, on the preparation of fruit and vegetables for freezing, includes a list of the most suitable varieties tested at Ottawa, and notes on the condition in which they should be harvested.

844. ÜLKÜMEN, L.

Malatyadan mühim meyve çeşitleri üzerinde morfolojik, fizyolojik ve biyolojik araştırmalar. Morphologische, physiologische und befruchtungsbiologische Untersuchungen der wichtigsten Obstsorten von Malatya. (Morphological, physiological and fertilization-biological investigations of the most important fruit varieties of Malatya.)

T.C. Yüksek Ziraat Enstitüsü çalışmalarından. (Investigations of the Yüksek agric. Inst. Ankara.) No. 65, 1938, pp. 439 Turkish and 256 German, bibl. 53, illus. [received 1949].

This is an account of observations on fruitgrowing in Malatya. It is in two portions, the first being a general account of the biological aspects of fruit trees, particularly in relation to fruit development, while the second gives detailed descriptions of the morphology, physiology and phenology of the varieties of apple, pear and apricot grown.

845. LAI-YUNG LI AND CHU-YING CHOU.

The vitamin C content of some Fukien fruits. [Chinese, English summary 1 p.]

Fukien agric. J., 1947, 9: 14-22, bibl. 14.

Includes 26 varieties, representing 18 species, some temperate and some sub-tropical.

846. HENNING, W.

Morphologisch-systematische und genetische Untersuchungen an Arten und Artbastarden der Gattung *Malus*. (Morphological-taxonomical and genetical studies on species and species hybrids of the genus *Malus*.)

Reprinted from Züchter, 1947, 17/18: 289-349, bibl. 66.

[See also *Plant Breeding Abstracts*, vol. xix, No. 2.] The following is a translation of part of the author's extensive summary. The investigation was carried out at the Erwin Baur Institut, Müncheberg. (1) The first part of the paper presents a systematic classification of *Malus* spp. on the basis of fruit, flower and leaf characters. The species are described in detail and the boundaries between species are defined as clearly as possible. (2) The *M. baccata* group is defined more closely and the form var. *jackii* is relegated to *M. prunifolia*, some hybrid forms being eliminated. (3) The *prunifolia* group is defined. *M. nigra* and *M. orthocarpa* as well as var. *jackii*, are transferred to this group; they may be considered as varieties. (4) Forms of *M. baccata* and *M. prunifolia* with large fruits, frequently used in breeding, are considered to be hybrids with *M. asiatica* and with cultivated varieties. (5) The origin of cultivated varieties is discussed in connexion with the *pumila* group. Observations on seedlings from cultivated varieties and on the progeny of crosses between wild species and cultivated varieties tend to show that *M. baccata* and *M. prunifolia* had no share in the origin of the European-American apple varieties. Probably only forms of the *pumila* group are involved. (6) In the second part the author reports on his own genetical studies. Calyx behaviour, general fruit shape, fruit colour (red to non-red) and relative length of stalk were found to be inherited in a comparatively simple manner, while fruit size, other fruit characters and colour shades of the fruit skin are

inherited on a polygenic basis. (7) *M. baccata* var. *himalaica*, *M. zumi* and *M. coronaria* proved relatively homozygous in respect of the characters examined, in contradistinction to *M. prunifolia* and *M. cerasifera*. (8) Crosses of *M. baccata* var. *himalaica* with Ernst Bosch yielded a progeny which is characterized by a favourable combination of relatively large-sized fruits, long stalks and good flavour. Although the wild species is generally dominant, the influence of the cultivated variety is considerable; hence this cross may be valuable in breeding.

847. ANON.

Vitamin-Indholdet i danske Aebler. (Vitamin content of Danish apples.)

Dansk Havebr., 1948, 7: 233.

The Vitamin-Laboratorium has studied the vitamin C content of Danish apples for many years. Figures are given for 15 varieties, Bramley Seedling taking the first place with 25.0-3.8 mg./100 g. and Signe Tillisch the second with 9.6-27.6 mg./100 g.

848. DERMEN, H.

Chimeral apple sports, and their propagation through adventitious buds.

J. Hered., 1948, 39: 235-42, bibl. 10, illus.

It has been established that in general three distinct chimaeral conditions exist in the apple, depending on which of the three primary cell layers gives rise to the mutant material. In this paper the author discusses how variation in the depth of these layers may affect the size of fruit in polyploid sports, and the nature of fruit colour in colour sports. The constitution of that old pomological curiosity, the "Sweet and Sour" sport of Rhode Island Greening, is shown to be that of a periclinal chimaera. Adventitious buds generally arise from innermost tissue, so, in an attempt to obtain a homogeneous tree from one having a desirable sport confined exclusively to the third histogenic layer, the author has developed a method of inducing adventitious bud growth in apple trees. This method was only successful with certain varieties, notably Red McIntosh and Starking, but it has not yet been widely tested.—U.S.D.A. Plant Industry Station, Beltsville, Md.

849. JUDKINS, W. P., AND OTHERS.

Promising apple and pear varieties.

Amer. Fruit Gr, 1949, 69: 1: 17, 31, 54, 56.

A discussion of trends in the east and in the north-west of the United States and in British Columbia by experts from these areas.

850. KARNATZ, H.

Ueber den Geschmackswert unserer Apfelsorten. (On flavour evaluation in apple varieties.)

Mitt. Obstb. Versuchsr. Jork, 1947, No. 10, pp. 3-4, No. 11, p. 1 and 1948,* pp. 30-2.

The flavour of apple varieties was evaluated by a panel of tasters, who gave points for acid and sugar content, aroma, dry matter and flavour as a whole. For many varieties the results did not agree with the official classification determining price grades. The rootstocks E.M. IX and XI appear to have a favourable influence on flavour. The second communication

* From 1948 onwards the page numbers run consecutively through the Volume.

reports the data obtained in a repetition of the 1947 tests. It is interesting to note that the improved sugar: acid ratio resulting from the hot summer was generally not associated with improved flavour. The mild winter of 1947/48 had a bad effect on keeping quality.

851. SHAND, P. M.

Older kinds of apples [in Britain].

J. roy. hort. Soc., 1949, 74: 60-7, 88-97.

A report of a lecture, the main theme of which is that quality is infinitely more important than quantity, and wide variety more enriching to existence than monotonous uniformity or "rational standardization". It is argued that, as regards flavour, our modern apples are neither so good nor so varied as the older ones. The reasons why so many of the older varieties have disappeared are explained. Reference is made to a search, carried out during the war, for old apple varieties, over 200 of which were found and propagated. The merits of numerous older kinds are discussed at some length.

852. CHEVALIER, A.

Le centenaire de l'obtention et de la mise en culture du poirier Passe-Crassane. (The centenary of the Passe-Crassane pear.)

Rev. int. Bot. appl., 1949, 29: 315-16: 64-7.

LE GRAVEREND, E.

La Passe-Crassane (poire rouennaise). (The Passe-Crassane (Rouen pear).)

ibid., 1949, 29: 315-16: 67-9.

Some notes on the origin, history, and characteristics of this winter pear.

853. DUHAN, K.

Bewährte russische und baltische Apfelsorten für rauhe Lagen. (Tested Russian and Baltic apple varieties for exposed localities.)

Bodenkultur, 1948, 2: 36-42.

The five varieties described are illustrated each by a colour plate showing two specimens and a photographic plate showing two cross sections.

854. MANN, A. J., AND KEANE, F. W. L.

Soft tree fruits for British Columbia.

Amer. Fruit Gr., 1949, 69: 1: 23, 42.

A description of three stone fruit varieties bred at the Dominion Experimental Station, Summerland, B.C., namely Reliable apricot, Van cherry and Spotlight peach.

855. RODRIGUES, A.

Sôbre a caracterização da forma das drupas e dos seus caroços. (The form of stone fruits and their stones.) [English summary ½ p.]

Agron. lusit., 1945, 7: 377-84, bibl. 2, illus. [received 1949].

This article describes a method of representing the characters of drupe stones necessary for defining their shape. Examples from peach and olive are given.

856. DE SONNAVILLE, P.

Rode mutanten van Reine Claude d'Oullins.

(Red mutants of Reine Claude d'Oullins.)

Fruitteelt, 1948, 38: 808.

A branch of an Oullins Gage tree at Zierikzee in southwest Holland has produced, during the last eight years, purple red fruit contrasting with the yellow of the true variety. Graft wood from that branch has produced trees with purple red fruit. Similar mutants have appeared at three other places in Holland.

857. ZIELINSKI, Q.

Ascorbic acid content of 33 peach varieties in relation to genetic and environmental factors.

Proc. Amer. Soc. hort. Sci., 1948, 52: 143-8.

Analyses of peach fruits at Corvallis, Ore., in 1947 showed that ascorbic acid content ranged from 8.87 to 0.00 mg. per 100 g. fresh fruit. The conclusion is reached that the production of vitamin C is largely under genetical control and that the environmental factors studied in this report had only a modifying effect.

858. WEINBERGER, J. H.

Recent peach introductions.

Amer. Fruit Gr., 1949, 69: 1: 20, 46-7.

"The attempt has been made to mention only those new varieties that are gaining in importance as commercial varieties and those that, though relatively untested, are attracting increasing attention."

859. CAMPBELL, R. W.

More than thirty peach varieties survived minus thirty-two degrees Fahrenheit.

Proc. Amer. Soc. hort. Sci., 1948, 52: 117-20, bibl. 5.

Observations on resistance of 32 peach varieties to winter injury in Manhattan, Kansas.

860. CHEVALIER, A.

Sur un mûrier africain. (On an African mulberry.)

Rev. int. Bot. appl., 1949, 29: 315-16: 69-74, bibl. 5.

A botanical note on *Morus mesozygia* Staph., the only African species, its history, affinities, variations, and uses.

861. GARDNER, V. R., AND TOENJES, W.

Strain differences in the Montmorency cherry.

Quart. Bull. Mich. agric. Exp. Stat., 1948, 31: 83-90.

In the course of an extensive study of bud variation of tree fruits in Michigan, 165, apparently permanent, variant forms were found in Montmorency cherry orchards. These were propagated and the trees grown to fruiting age. Extensive records were made of yields and other characteristics of the variant strains in comparison with those of the normal form. When the collection was made in the nineteen-twenties, the yellow leaf virus was not recognized and many diseased trees were included. This gave an opportunity of comparing the growth and performance of infected and healthy trees. Thus, for instance, after 6 years in the orchard (8 years after budding), the virus-free trees of many strains had an average trunk circumference of 7.2 in. and an average yield of 11.9 lb., as against 5.5 in. and 6.1 lb. recorded in the virus-infected trees of numerous selections. Comments are made on individual strains, including 5 with a performance superior to that of the ordinary variety.

Propagation and rootstocks.

862. KEMMER, E., AND GISEVIUS, R.

Zur Frage der Wurzlingsvermehrung bei Obstgehölzen. (The propagation of fruit trees by root cuttings.)

Gartenbauforschung, 1948, 2: 9-18.

Results are given of an extensive trial designed to obtain fundamental data on the behaviour of root cuttings. Material from apple, pear, plum, bird cherry, apricot and peach trees was used, and the effect of the following factors was investigated: Place of propagation, season of propagation, nature of parent material, age of parent material, size of cutting, and frost. The type of roots made by root cuttings of one stock variety grafted with various scion varieties was compared, the results suggesting that the stock is influenced by the scion. It is concluded that the main commercial use for root cuttings is for the propagation of certain clonal rootstocks, Malling IV and XI apple stocks being most suitable.—Berlin-Dahlem.

863. NISWONGER, H. R.

Budding and grafting fruit trees.

Ext. Circ. N. C. agric. Ext. Serv. 326, 1948, pp. 11, illus.

"The purpose of this circular is to assist the fruit grower in the propagation of his own fruit trees; to change an undesirable variety to a more desirable one; and to repair trees damaged by field mice and rabbits." A clear and simple account is given of bench grafting of apples, shield budding of peaches, top grafting and bridge grafting, by the methods generally practised in N. Carolina. It is not intended to be a comprehensive account of the practice of grafting, or the propagation of fruit trees, and it does not deal with the raising or choice of rootstocks.

864. TALBERT, T. J.

Top and double working, and bridge grafting of fruit trees.

Circ. Mo. agric. Exp. Stat. 320, 1948, pp. 16, illus.

Practical instructions on some methods and uses of grafting. Although written for the Missouri fruit grower, most of the information is applicable generally.

865. HUTTON, F. V.

The propagation of clonal stocks by layering and root cuttings.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort., 4th annu. Meet.*, 1948, pp. 25-6, bibl. 2.

The growth of knowledge on the subject is demonstrated by six abstracts from the work of various investigators in the U.S.A., England, Canada, and South Africa, beginning with the work of J. K. Shaw, Amherst, Mass., in 1919. [Bibliography incomplete.]

866. TERRY, H. B.

Budding deciduous fruit trees and stocks.

Fmg S. Afr., 1949, 24: 17-18, illus.

Notes on the selection of budwood, preparation of the stock, cutting the buds, and subsequent treatment.—Division of Horticulture, Pretoria.

867. EVENARI, M., KONIS, E., AND ZIRKIN, D. On the germination of some rosaceous seeds. 1. The germination of apple seeds. *Palest. J. Bot. (J.)*, 1947, 4: 86-9, bibl. 8 [received 1949].

It proved impossible to germinate the seed of any of the varieties used without after-ripening. The after-ripening must be done at a low temperature and in moist conditions. The optimal duration of the wet, low temperature stratification is 3 months. The after-ripening can be effectively done when the seeds are still inside their fruit by placing the whole fruit in the refrigerator. [From authors' summary.]

868. EVENARI, M., KONIS, E., AND ZIRKIN, D.

On the germination of some rosaceous seeds. II. The germination of Kerassi seeds [*Prunus cerasia* Bl.].*Palest. J. Bot. (J.)*, 1948, 4: 166-70, bibl. 3.

Kerassi, *Prunus cerasia*, indigenous in Palestine, is used there as a rootstock for plums, being suited to local edaphic conditions and resistant to capnodis and nematodes. An account is given of stratification experiments in Palestine with seeds of both sweet and sour varieties. Stratification of sweet Kerassi seeds under wet, cool conditions brought about normal germination, the optimum time being 3 months (germination 75%). After-ripening is apparently not wholly dependent on stratification, but starts when the seeds are stored. From a practical point of view the best time for planting the seeds is from January to the beginning of March. The stratification has to be suited to the planting date. Experiments with seeds of the sour Kerassi variety gave the same results as those obtained with the sweet but the optimal stratification time was 4 months.

869. KARNATZ, H.

Ursachen der Keimhemmung bei den diesjährigen Apfelsaaten und Möglichkeiten ihrer zukünftigen Ausschaltung. (The inhibition of germination in apple seeds; causes and possible remedies.)

Mitt. ObstbauVersuchsr. Jork, 1948, pp. 33-6.

Great difficulties were experienced by nurserymen in germinating apple seeds of the 1947 harvest. Jork Research Station, on the other hand, obtained very satisfactory results from stratification of apple and pear seed in the middle of December. After three months' storage at 0-4° C. germination occurred within 8-10 days of transferring the seed to a temperature of 8-10° C. The experiments continue.

870. ALLEN, H. T.

Germination requirements of seeds of trees and shrubs.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort., 4th annu. Meet.*, 1948, pp. 26-9, bibl. 19.

Seeds are best stratified by mixing thoroughly with the medium. The best medium is granulated peat moss. For general purposes a stratification temperature of 40° F. is best. Freezing, or freezing and thawing, are means of natural forcing through seed coat changes. Chemicals are generally of no use in shortening the after-ripening period, but concentrated sulphuric acid can be used to advantage in softening seed coats of such seeds as *Cotoneaster*, *Crateagus*, *Syphoricarpos* and *Tilia*. Removal of seed coats prior to germination may result in dwarf seedlings and seeds may be more subject to fungal infection. In most cases, dry storage for reasonable periods has no deleterious effect, but some seeds lose viability on desiccation. No certain

method of testing viability prior to stratification has yet been established. The essential information for complete reports on seed germination is indicated. [From author's summary.]

871. NATIVIDADE, J. V., AND COELHO, J. M. N. S. Propagação vegetativa da oliveira (*Olea europaea* L.). (Vegetative propagation of the olive.) [English summary 1 p.] *Agron. lusit.*, 1946, 8: 123-9, bibl. 4 [received 1949].

Trials with hardwood and semi-hardwood cuttings are described. The best results were obtained with semi-hardwood cuttings, etiolated at the base, taken in December, and with branched hardwood cuttings, etiolated at the base, taken in November.

872. BANGA, O. Het kweken van nieuwe vruchtboomonderstammen in Engeland. (Raising new fruit tree rootstocks in England.) *Meded. Dir. Tuinb.*, 1949, 12: 5-10, 69-76, bibls. 8 and 14.

A review, by the Director of the Horticultural Plant Breeding Station in Holland, of the work carried out at the East Malling Research Station in collaboration with the John Innes Horticultural Institution. The second part deals particularly with the raising of apple rootstocks immune to woolly aphids.

873. ELFINK, G. Moeilijkheden met vruchtbomen op zwakke onderstammen. (Difficulties with fruit trees on weak rootstocks.) *Fruitteelt*, 1949, 39: 244-5.

The author discusses the effect of too deep planting on temporary trees on dwarfing rootstocks, namely that they become self-rooted, grow too vigorously and are slow to fruit. To avoid this, (1) such trees should be planted with the union well above the soil, (2) any soil thrown round the trees during cultivation must be removed, (3) any winter mulching put round the trees should be removed when frost is no longer to be feared, (4) the bases of the stems should be kept clean during the growing season.

874. HUTTON, F. V. The influence of stock and scion on hardiness. (Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 3rd annu. Meet., 1947, pp. 42-6.

Twenty-four short notes of findings of different authorities dating from 1899, varying considerably in value.

875. LOEWEL, E. L. Der augenblickliche Stand unserer Kenntnisse über die Unterlagenfrage bei Äpfeln. (Our present knowledge of apple rootstocks.) *Mitt. Obstb. Versuchsr. Jork*, 1948, pp. 37-40.

A comment on most of the E.M. types after 15 years of German rootstock trials. E.M. XI deserves to be raised intensively in Germany, since it produces healthy trees and can be successfully used in a great variety of conditions. E.M. IV, a poor second, is particularly suitable for moist soils. The work on seedling rootstocks is briefly discussed.

876. MALAN, E. F. Influence of rootstocks on apple production. Experiments on Northern Spy, Sweet Apple [Wemmershoek] and Merton No. 793 rootstocks.

Fmg S. Afr., 1949, 24: 21-4.

Trials of Rome Beauty apple trees on three rootstocks are recorded. The vigour and yield of the scion variety was better throughout on Wemmershoek than on Northern Spy or Merton 793. The influence of the rootstock on the height of the tree, the spread of branches and the quantity of wood removed during winter pruning are discussed.

877. KEMMER, E. Zur Frage des Einflusses der Edelsorte auf die Unterlage. (The influence of scion on stock in apple trees.) *Züchter*, 1948, 19: 115-18, bibl. 6, illus.

The influence of the scion on apple rootstocks, and ways in which this can best be demonstrated are considered. As root growth can be influenced by so many factors, the author suggests that scion influence can best be seen in the scion itself. The less favourable the growing conditions, the more clearly should this effect show. A trial was laid out of uniform M. IX stock, grafted with 16 different scion varieties in 1942. In spring 1947 part of the plot was grassed down, and part cultivated as a control. That summer most varieties under grass (especially Signe Tillish, Red Astrachan, Gold Pearmain and Gravenstein) showed definitely weaker growth and paler foliage than the controls. Some, however (e.g. Oldenburg, Boskoop, and Laxton's Superb), showed no ill effects. Average circumference of stem was taken as the measurement of growth. As vigour of scion and response to grassing-down are unrelated, an influence of scion on stock is concluded. Further investigations, using ungrafted stocks as controls, are suggested.—Berlin-Dahlem.

878. PFANNENSTIEL, A., AND PFANNENSTIEL, D. Ueber die Möglichkeit, den Apfelbaum auf den Birnbaum zu veredeln und umgekehrt. (Grafting apple on pear and vice versa.) *Schweiz. Z. Obst.- u. Weinb.*, 1949, 58: 116-17, bibl. 5.

The authors did not experience any difficulty in working apple varieties on young pear seedling rootstocks and pear varieties on apple seedlings by means of the root grafting technique. Of the 2-3 buds of the scion only one need be above ground, while the union must be in the soil. So far, the 3-year-old plants have not shown any incompatibility or tendency to scion root. The roots grew well and did not sucker.

879. WEEKS, W. D. Further scion and stock combinations with Spy 227. *Proc. Amer. Soc. hort. Sci.*, 1948, 52: 137-40, bibl. 5.

Various stock and scion combinations of Spy 227 were made to determine the nature of the lethal principle which causes certain varieties and strains to die when propagated on Spy 227 rootstock. It was demonstrated that the toxic principle could be transmitted from a lethal strain to a congenial strain, which would indicate that the trouble was of a virus nature. It was

also shown that the toxic principle causing death, where lethal strains are involved, is not due to any material manufactured in the leaves. [Author's summary.]

880. BARROS RODRIGUES QUEIROZ, J.

Estudo dos padrões aconselháveis para as diferentes espécies e variedades de fruteiras.
(A study of rootstocks recommended for various species and varieties of fruit.)

Agron. angol.,* 1948, 1: 21-41.

Fruit growing is such a new industry in Angola that no knowledge has yet been acquired about the behaviour of rootstocks in the local conditions of soil and climate. The author has attempted a preliminary study of this problem, and gives the results obtained during a 4-year trial of rootstocks imported from Portugal or South Africa, and local seedlings. Although in most cases experiments were on a small scale, there are indications that Northern Spy and Cape Seedling are well adapted to Angolan conditions, and will make vigorous, quick growing apple stocks. The pear stock Calhau was found compatible with all the varieties used, and with some, including Beurré Hardy and Winter Nelis, it made strong growth. Extensive trials of citrus rootstocks have been started in the Huíla area.

881. LOOSE, H.

Der Wert der *Myrobalana alba*—Pfälzer Typ als Unterlage. (*Myrobalana alba*—Palatinate type, a valuable plum rootstock.)

Ceres, Hamburg, 1948, 1: 11: 6.

Renewed attention is drawn to the merits of *M. alba* as a plum rootstock, which is easily propagated by cuttings, possesses a high degree of frost resistance, induces early and prolific bearing in plum varieties on a wide range of soils, is well anchored and is not liable to sucker formation.

882. CUÉNOT, G., BALLOT, R., AND PRALORAN, J. C.

Observations sur le comportement de différents porte-greffes des pruniers au Maroc.
(The performance of various plum rootstocks in Morocco.)

Rev. hort. Paris, 1948, 120: 340-5, bibl. 3.

A preliminary report of plum rootstock trials held at the Station Régionale Horticole d'Aïn Taoudat, Morocco. Six rootstocks, including myrobalan, brompton and common mussel, were grafted with the varieties Agen, Giant, Golden Japan and Santa-Rosa. After 9 years the vigour and compatibility of the different stocks were compared. Attacks of the beetle, *Capnodis tenebrionis*, had caused heavy losses, but it was observed that the stocks brompton and E.F.74 (a local strain of myrobalan) showed a marked resistance to the beetle. Both these stocks proved compatible with the varieties tried. Brompton showed medium vigour, E.F.74 was very vigorous. The trials are being continued.

883. LOEWEL, E. L.

Das Verhalten verschiedener Pflaumen- u. Zwetschsenarten auf den bekanntesten Stammbildnern. (The behaviour of different plum and zwetschen varieties on some well-known stem builders.)

Mitt. Obstb. Versuchsr. Jork, 1947, No. 16, pp. 2-4.

* Luanda, Angola.

Trials have shown that of all the stem builders tested the frost-hardy plum, Kleine Blaue Pflaume, has the best record of compatibility with the 8 plum varieties used in the trial.

884. GARNER, R. J.

Plum rootstocks.

Worcestershire agric. Chron., 1948, 17: 53-71.

Possible methods of raising plum rootstocks are discussed. With few exceptions seedling rootstocks should be avoided. Although layering is the general method of propagation, Marianna and Myrobalan B root readily from hardwood cuttings, Mussel stocks are often propagated by root cuttings, and suckers are the only practical source of Pershore stocks. The value of the Rootstock Certification Scheme in preventing losses due to incompatibility is stressed. Figures are given comparing certain rootstock effects, such as early cropping, suckering, anchorage and disease resistance. Common plum shows good resistance to silver leaf, and Myrobalan B to bacterial canker, so that high working of the latter gives good protection. The properties of the five main rootstocks are discussed. Although there is no good dwarfing stock yet available, there are indications that one may be forthcoming.

885. MCCLINTOCK, J. A.

A study of uncompatibility between peaches as scions and the Marianna plum as a stock.

J. agric. Res., 1948, 77: 253-60, bibl. 16, illus.

Peach buds of a number of varieties unite readily with Marianna plum stock, and preliminary growth appears satisfactory, but during the second growing season trees of this combination generally show incompatibility. An early symptom is the enlargement of the basal portion of the peach scion just above the union with the plum stock. Later the peach leaves begin to wilt and this is generally followed by death of the entire tree. Microscopic examination of sections showed the failure of the plum stock and the peach scion to unite. In compatible unions of plum on plum both xylem and phloem united.—Purdue Univ. Agricultural Experiment Station.

886. TRENKLE, R.

Zur Frage des Süsskirschenanbaues und der Vogelkirschen-Unterlage. (Sweet cherry growing and *Prunus avium* rootstocks [in Germany].

Ceres, Hamburg, 1948, 1: 11: 1-5.

A discussion of sweet cherry rootstocks for German conditions, with special reference to frost hardiness and resistance to gumming (Gummifluss). The author's observations made over many years in the Bavarian foothills and in other areas, suggest that in *Prunus avium* health is usually associated with a pyramidal shape of the top and a straight elongation of the central leader or with a light, smooth bark and the rather upright growth of the branches. A relationship between fruit colour and resistance may exist as well. Research stations should make a genetical study of *Prunus avium* progenies for the selection of suitable sources of seed. Trials with the resistant triploid Theissinger Sämling [see *H.A.*, 19: 104], discovered by the author, has shown its compatibility as a stem builder. The final aim must be to raise resistant

cherries without double-working. In this connexion reference is made to preliminary experiments with seed of the variety Dönnissens Gelbe Knorpelkirsche. Seedlings from this variety appear to be of greater uniformity and of greater promise generally than most wild cherry seedlings.

887. FEY, W.

Die Baumrodemaschine (System Fey). (The Fey tree grubbing machine for the nursery.)
Dtsch. Baumschule, 1949, 1: 19-20.

A plough is described which loosens and lifts the soil under the trees so effectively that they can be pulled out with all their fibrous roots intact. With this machine 2,000-2,500 trees were lifted per hour from nursery rows about 660 ft. long. Special features of the machine are a blade attached at an angle of 25-30° and 3 prongs. An illustration of the grubber will be published in a later number.

Pollination and bee problems.

888. KRAMER, J. C.

Traps for the collection and distribution of pollen in orchards.

Quart. Bull. Mich. agric. Exp. Stat., 1948, 31: 12-21.

In this well-illustrated article a new and effective device for ensuring cross pollination in orchards is described, consisting of a pollen-collecting trap that collects the pollen from the bees as they enter the hive and a distributing trap that conveys it to the outgoing bees. The first, which is placed in the hive entrance, is a perforated metal plate or screen $14\frac{1}{2} \times 3$ in., with $\frac{1}{8}\frac{1}{4}$ in. perforations to suit the standard 10-frame hive. Such a trap will collect 12-20% of the pollen, leaving a sufficient quantity to pass through for the needs of the colony. Pollen thus gathered in one orchard is mixed with a diluent, preferably lycopodium spores, and transferred to another orchard where it is wanted. There the mixture is placed in a distributing trap through which the bees are forced to scramble upward as they leave the hive. To obtain maximum efficiency with varieties requiring cross pollination the colonies should not be moved to the orchard before full bloom and until a day temperature of 65°-75° F. is expected. In these circumstances the flying radius of the bees is reduced to the immediate vicinity for a day or two. If the pollen gathered is not to be used at once, for instance if pollination of a later by an earlier variety is intended, the pollen-diluent mixture can be stored for a limited period under dry conditions at 34°-36° F. The operation of placing the traps in the entrances of bee-hives may be unpleasant.

889. DU PREEZ, D.

The dropping of immature figs.

Fmg S. Afr., 1948, 23: 817-18, 822, 830, illus.

Fig varieties grown in South Africa are classified into four groups, (I) those requiring caprification in order to set a crop, e.g. Smyrna and Calimyrna, (II) the San Pedro type (e.g. Castle Kennedy) which sets and matures its first crop but requires caprification for the second and main crop, (III) the inedible, pollen-producing, Capri types (Nos. 1, 2, and 3) which provide a habitat for the pollinating wasp *Blastophaga psenes*, (IV) the

common figs, which do not require caprification, e.g. White Genoa, White Adriatic, Cape White, New Brunswick, Kadota, and Adams. To caprify groups (I) and (II), small wire baskets of Capri figs harbouring *Blastophaga* are hung in the trees once or twice during the season. Home gardeners are advised not to plant figs of groups (I) or (II). Possible causes given for fruit drop in group (IV) are: improper cultivation and irrigation, lack of nitrogen, adverse climate, pests and disease.

890. CONDIT, I. J.

Parthenocarpy in caprifigs.

Proc. Amer. Soc. hort. Sci., 1948, 52: 233-6, bibl. 6.

"Three kinds or degrees of parthenocarpy are found in caprifigs—in the first, no cenocarps or seedlike bodies occur; in the second, cenocarps are found but the syconia are dry at maturity; in the third, numerous cenocarps occur and the mature syconia are pulpy and more or less edible, a character which suggests the possibility of growing these figs for stock feed or for by-products."

891. BLONDEAU, R., AND CRANE, J. C.

Early maturation of Calimyrna fig fruits by means of synthetic hormone sprays.

Science, 1948, 108: 719-20, bibl. 2.

The maturation of the Calimyrna fig fruits was reduced to 60 days, from the normal average of 120 days, by spraying unpollinated but pollen-receptive syconia with solutions of 2,4,5-trichlorophenoxyacetic acid. A spray of indolebutyric acid at 1,500 p.p.m. was effective in setting parthenocarpic fruit. The fruits thus formed were comparable in size and colour to mature, pollinated (caprified) fruits. Although completely devoid of achenes ("seeds"), the hormone-produced fruits were well filled with pulp and quite palatable. Such a phenomenal speeding-up of fruit development is believed to be of considerable interest. It is a strong indication of the hormonal nature of fruit ripening. The results further emphasize the high degree of specificity of the synthetic hormones and the responses they induce. 2,4-D, even at 100 p.p.m., was ineffective in hastening maturation, whereas the very closely related compound 2,4,5-trichlorophenoxyacetic acid was strikingly effective.

892. VON FRISCH, K.

The dances of the honey bee.

Bull. Animal Behaviour, 1947, No. 5, pp. 32, bibl. 11, illus.

This ingenious and delightful piece of work should give pleasure to bee-keepers and inspiration to adventurous biologists. The way in which bees communicate to each other the direction and distance of a source of food is detected and described with infectious enthusiasm. Whether this will be of practical horticultural value remains to be seen, but a reference to further research, on how this knowledge of the "language" of bees can be used to control their pollinating activities, suggests far-reaching possibilities.

893. ECKERT, J. E.

Toxicity of some of the newer chemicals to the honeybee.*

J. econ. Ent., 1948, 41: 487-91.

* See also 1114, 1135.

More consideration of the effect on the bee population of choice of insecticide and strength and time of application would prevent much needless destruction of bees. Tests made at the University of California, Davis, indicate that the phosphates, including HETP, TEPP and parathion, are toxic to bees in minute quantities but that they lose toxicity very quickly; therefore, careful timing of the sprays is important. Chlordan remains highly toxic for several weeks. Dichloro-diphenyl-dichloro-ethane, on the other hand, in dilutions above 1 to 5,000, was found to be harmless.

894. JOHNSON, J. P.
Sulfa drugs for American foul brood of honeybees: Third report.

J. econ. Ent., 1948, 41: 314-18, bibl. 2.

The combined results of 3 seasons' work at the Connecticut agric. Exp. Stat., New Haven, on the feeding of sulpha drugs to bees, is here given. It was found that sulphathiazole, sodium sulphathiazole, and sulphadiazine, fed at the rate of 0.5 g. per gallon of sugar and water mixture to colonies infected with American foulbrood, will all eliminate the disease for a period of 2 years after treatment. The length of treatment will depend on the population of the hive, and the number of diseased frames and old stores present. Sulphaguanidine gives good control but is slower in action. X-ray treatment appeared to have no effect on the disease spores.

895. ECKERT, J. E.
The use of sodium sulfathiazole in the treatment of American foulbrood disease of honeybees.

J. econ. Ent., 1948, 41: 491-4, bibl. 4.

From observations made at the University of California, Davis, on the way in which sulphathiazole is used by the bees, and distributed throughout the hive, the author concludes that it should only be used for the treatment of colonies known to be diseased, and then only under specialist supervision. "Due to the danger of introducing even small quantities of sulfathiazole in marketable honey the general use of this drug as a preventive measure in the control of American foulbrood is not justified at the present time."

Growth and nutrition.

896. NATIVIDADE, J. V.

A diferenciação e a evolução dos gomos florais das fruteiras. (The differentiation and evolution of the flower buds of fruit trees) [Summary in English and French.] *Bol. Junta nac. Frut. Lisboa*, 1948, 8: 359-71, illus.

The differentiation of the floral organs within the buds of fruit trees and the conditions under which it is initiated are discussed. Operations which might influence the development of the buds are pruning, weeding, manuring, conservation of moisture during summer, thinning of fruit, and control of pests and diseases. The differentiation starts 8 to 10 months, according to the species, before the flowers open, and when the process is complete no horticultural operations will increase the number of flowers which will open the following spring. The development of the floral organs in apple from early in July to the end of January is shown in 8 photomicrographs.

897. FELBER, I. M.

Growth potentialities of vegetative buds on apple trees.

J. agric. Res., 1948, 77: 239-52, illus.

The development of bud and leaf sizes on the current year's apple shoots is not correlated during the early stages of growth, and only after about 6 or 8 weeks of seasonal growth does a direct relationship between the area of subtending leaves and their axillary buds become evident. The frequency of dormancy among lateral buds is inversely correlated with increasing bud size. Shoots with the largest total leaf area are least affected by premature leaf drop during the season. The position of the bud along the axis is an essential factor that determines the actual performance of the bud, and may interfere with its growth potentiality as indicated by size.—Michigan Agricultural Experiment Station.

898. CARRANTE, V.

La produzione ovulare dell'olivo. (The production of ovules in the olive tree.)

Reprinted from *Olearia*, July 1948, 23 pp., illus.

The author discusses in some detail the conclusions reached by Morettini and others with regard to ovule formation in olive. He himself deplores a fairly recent tendency to use ovules for the vegetative reproduction of the olive. He considers that they are possibly a pathological or, at all events, an undesirable physiological phenomenon. He notes that their origin, function and prevention—if thought desirable—are to be the subject of research at the Bari Experiment Station in southern Italy.

899. CRANE, J. C.

Fruit growth of four fig varieties as measured by diameter and fresh weight.

Proc. Amer. Soc. hort. Sci., 1948, 52: 237-44, bibl. 12.

Weekly measurements of Mission, Adriatic, Kadota and Calimyrna figs show them to possess periodicity of growth similar to that in stone fruits. This cyclic growth may, it is suggested, be due to some physiological factor, such as variation in supply or activity of a hormone or enzyme, which would appear to be localized within the fruit.

900. LIWERANT, J.

Contribution à l'étude de la nutrition du pêcher. (3e Mémoire.) (A study of peach nutrition. 3rd Communication.)

Ann. agric. Paris, 1948, 18: 589-92.

The analytical data presented show that in the flower buds of all peach varieties the N, P_2O_5 and K_2O contents increase during the winter, irrespective of meteorological and other environmental conditions, while the CaO content decreases. Although the extent of these processes is determined by both varietal and meteorological factors, it seems that weather has more influence than variety.

Manuring and cultural practice.

(See also 769, 805-807, 822, 1659.)

901. WALLACE, T.

Manuring of neglected orchards.

Worcestershire agric. Chron., 1948, 17: 101-9.

The manuring of a neglected orchard should be dealt with only after the effect of pruning and spraying have been noted, for nitrogen requirements will be modified by pruning and exposure to sunlight, and deficiency symptoms may be masked on diseased or infested foliage. Visual symptoms of mineral deficiencies are described, and methods and rates of application of fertilizers, and systems of grass management, advised.

902. WALLACE, T.

Nutrition of plum trees.

Worcestershire agric. Chron., 1948, 17: 31-45.

One of the main problems of plum nutrition is how to replace the bulky organic manures that were traditionally used on arable orchards. Established orchards may be grassed down, and the nitrogen supply maintained by grass cuttings and heavy dressings of fertilizer. It is advisable to plant a new orchard on old grassland soil, for the good structure of such soil persists for many years. Lime should be used with caution, for iron deficiency is very likely to occur on calcareous soils. Nitrogen, potassium and iron are the three elements most likely to be deficient in Worcestershire orchards, potassium being the most serious, as it causes low-temperature breakdown of fruits in store. The relative importance of the major elements and trace elements in plum nutrition, and the best means of supplying such nutrients, are discussed.

903. LACOMBE, R.

Fumure au pal injecteur. (Manuring with a fertilizer lance.)

Prog. agric. vitic., 1948, 130: 349-53, illus.

A report of a demonstration of the "Autopal" fertilizer lance in November 1948. The advantages of applying manures with a fertilizer lance are set out, and an account is given of this new automatic injector machine, with notes on the volume delivered, speed, dead time, and area covered in a day.

904. WILLIAMS, C. F., AND VEERHOFF, O.

Response of peach trees to boron.

Proc. Amer. Soc. hort. Sci., 1948, 52: 88-96, bibl. 9.

Trials from 1938 to 1940 in the Sandhills region of N. Carolina were inconclusive as to any direct relationship between borax treatment and yield of peaches. Results suggestive rather than conclusive are set out here. The treatments given were $\frac{1}{2}$ lb. borax, $\frac{1}{8}$ lb. borax and nil per tree.

905. FREAR, D. E. H., AND OTHERS.

Potassium content of various parts of the peach tree and their correlation with potassium fertilization—A sampling study.

Proc. Amer. Soc. hort. Sci., 1948, 52: 61-74, bibl. 8.

With both seedlings of known parentage and budded trees better vase form heads were developed when the trees were cut back to 18 inches in April after the buds had begun to swell than when so cut at planting time in February. Trees given fertilizer both in the first and second years grew better than those given it only in their first year.

906. BOYNTON, D., COMPTON, O. C., AND FISHER, E.

Further work on leaf nitrogen and leaf colour as measures of the nitrogen status of fruit trees.

Proc. Amer. Soc. hort. Sci., 1948, 52: 40-6, bibl. 4.

Continued observations in nitrogen fertilizer programmes of colour and nitrogen content of leaves at different seasons have now allowed the setting up of standard values for use in New York on McIntosh apples. This is not yet possible for Italian prune and Elberta peach.—Ithaca, N.Y.

907. SHEAR, G. M., AND HORSFALL, F., Jr.

Color as an index of nitrogen content of leaves of York and Stayman apples.

Proc. Amer. Soc. hort. Sci., 1948, 52: 57-60, bibl. 4.

Steps on the way to do for York and Stayman varieties what Boynton and Compton have already done for McIntosh. [See previous abstract.]

908. THOMAS, W., MACK, W. B., AND FAGAN, F. N.

Foliar diagnosis: The mineral nutrition of peach trees with particular reference to bacterial leaf spot.

Proc. Amer. Soc. hort. Sci., 1948, 52: 47-56, bibl. 10.

The trials reported took place on a silt shallow soil very low in organic matter in Pennsylvania, the peach varieties being Sunhigh, Goldeneast and Hale and the nutrients considered N, P, K, Ca and Mg. Defoliation by leaf spot caused by *Bacterium pruni* was found to be inversely related to vigour, which in turn was directly related to yield. No relation was found between the course of nutrition with respect to potash and the potash applied. In the leaves from the most vigorous tree, which showed the least damage from leaf spot, the content of potash was highest at the first sampling and in the trees of low vigour the potash content of leaves was also low. None of the elements examined, including Mn and Cl, approached the level generally found to be critical for deficiency or toxicity.

909. WILCOX, J. C.

Some factors affecting apple yields in the Okanagan Valley. V. Available P, K, and Ca in the soil.

Sci. Agric., 1949, 29: 27-44, bibl. 11.

An initial report from the Dominion Experimental Station, Summerland, B.C., is made on the P, K, and Ca status of the soil in the Okanagan Valley as determined by soil analysis only. Three phases of the work are presented and discussed in turn, as follows: analyses of soil samples from apple fertilizer plots; soil analyses from areas of known P and K deficiencies; correlations between soil analyses and apple tree performance. On the evidence obtained, the following fertilizer recommendations are made. (1) Apply sufficient nitrogen to mature apple trees to induce an annual terminal growth of 10-12 inches. (2) Apply phosphate as well as nitrogen to sandy or shallow soils, or to orchards where the original surface soil has been lost. Sufficient 16-20-0 fertilizer to induce 10-12 inches terminal growth is recommended. (3) Apply potash,

as well as nitrogen and phosphate, to soils that are both light and shallow. In this case the 16-20-0 fertilizer may be supplemented by muriate of potash. [See also *H.A.*, 15: 977; 16: 73 and 74; 17: 603; 18: 2365.]

910. EREINOFF, V. A.

Le verger en forme rampante pour les pays de latitude ou d'altitude élevées. (The horizontally trained orchard for high latitudes and altitudes.)

Rev. hort. Paris, 1948, 120: 300-4, illus.

The idea of a "creeping" orchard, trained horizontally within 30 cm. of ground level, was first devised by Kroutovsky in Siberia in 1903. Trees grown on this system were completely protected by snow from the severe winter temperatures that made the culture of normally trained apple trees impossible. They were able to benefit, too, from the lower wind velocity and higher summer temperatures and humidity that occur at ground level. This system of culture was later studied and perfected at the Experimental Station at Omsk, where a suitable method of pruning was devised. In this paper the culture and pruning is described in detail. Three methods of training are practised: the horizontal cordon, the horizontal fan, and the disc, branches being in each case held in place by wooden pegs. Great care is, of course, necessary to protect the trees from ground frosts after the snow has melted, and summer culture must all tend to the early ripening of the wood. This system can naturally only be practised where a thick cover of snow (more than 30 cm.) can be relied upon in winter, but currant or gooseberry bushes may be interplanted between the rows, or shelter-belts established, to increase the accumulation of snow. The author suggests that "creeping" orchards might well be planted in some regions of the Alps or Pyrenees that are now uncultivated.—Station d'Arboriculture de la Flambelle à Toulouse.

911. DAVISON, J. R.

Summer training of stone fruit trees on the Murrumbidgee Irrigation Area. Effect on winter pruning.

Agric. Gaz. N.S.W., 1948, 59: 589-94, 639-42, illus.

To avoid some of the undesirable effects of winter pruning a system of summer training is recommended. Although fortnightly topping may be required to produce the best results in peaches, excellent development can be got by summer topping four times at monthly intervals, or even fewer at longer intervals during the growing season. Two or three judiciously spaced treatments can greatly improve apricot trees, and minimize the necessity for hard cutting in winter.

912. THOMPSON, C. R.

Pruning of neglected orchards.

Worcestershire agric. Chron., 1948, 17: 95-9.

Treatment of neglected orchards will be economic only if the soil and drainage are favourable, the trees not too old, and the varieties recognized market sorts. The pruning of such an orchard would improve the quality and quantity of the fruit, and rejuvenate the trees. Details are given of the pruning suitable for the following types of neglected trees: (1) those that

have been making strong growth for several years, resulting in a dense tangle of branches, (2) those that yield slender wood and are growing weakly, (3) those that have made negligible growth for several years, resulting in a mass of old spur systems.

913. HILKENBÄUMER, F.

Schnitt von Apfelspindeln in Erwerbsobst-anlagen. (The pruning of apple spindle-bushes in commercial orchards.)

Ceres, Hamburg, 1948, 2: 2: 2-7.

The attitude towards the treatment of apple spindle-bushes has undergone a great change since 1935, when general opinion was in favour of reducing growth in the early years to promote precocity. It has been found that more vigorous trees on E.M. II, IV or I withstood the critical conditions of the war years very much better than trees on E.M. IX, which showed a strong tendency to premature senescence or were blown over when unstaked. In a trial with 9 varieties, planted [apparently at the author's institute in Halle] in 1936 and carried on for 7 years, three pruning treatments were compared: (1) Normal winter pruning, (2) tying down of the annual growth in August or in winter and pruning exclusively in spring, and (3) summer pruning, i.e. cutting back shoots of the second and higher orders to 4 buds in summer and pruning the elongation growth of the lateral shoots of the first order in winter. Each treatment was applied in 3 degrees of severity: (1) severe (=cutting back generally to 6 buds); (2) medium (to 9 or 12 buds, according to vigour), and (3) mild (to 12 or 15 buds). Data are presented on stem diameter in the 7th year, average fruit weight and number of fruits harvested annually from the 3rd to 7th year. The most important result transpiring from these experiments is that in commercial plantings all measures to induce early bearing in apple spindle bushes must be discouraged because they tend to lead to early senescence. Even in the more vigorous trees tying down of the annual growth in summer is unnecessary, while it is often harmful in the less vigorous ones. Tying down in winter caused breakage and the development of undesirable perpendicular shoots. In the case of Cox's Orange both tying down and summer pruning produced higher yields than winter pruning. The recommendation made is: During the early stages and while the tree is beginning to come into bearing the annual growth of vigorous bushes should be cut back to 15, or, at the most, 18 buds, and trees making only slight growth to 6-8 buds, intermediate vigour requiring an intermediate treatment. Immediate action is necessary when the formation of annual growth declines and bare patches at the bases of branches occur. It is essential to maintain the pyramidal shape of the tree.

914. JONES, C. H.

Permanent grass in bush orchards.

Grower, 1949, 31: 117.

A note on a Hampshire grower's satisfactory experience with grassing. His apple orchards, on heavy clay, were grassed down 26 years ago and have not been cultivated since. Cropping has been regular and all operations facilitated. A gang-mower is used to keep the grass down. Notes are given on fertilizers used. Nitrate of soda is preferred as a source of N. A bush

tree of Cox's Orange Pippin, 15-20 ft. span, would get about 3 lb. of this, applied in March. Plums and gages do as well in grass as apples.

915. OSMOND, D. A.

The influence of soils on fruit tree growth.
Worcestershire agric. Chron., 1948, 17: 73-93,
illus.

Recently a detailed survey has been made of the fruit growing and soils of the Evesham Valley, using established orchards as material for the study of soil effects on tree growth. A member of the team that undertook this survey gives an account of the geology of the district, and some of the effects observed. Drainage and the depth of the parent rock have an important effect on tree size. Plum varieties differ considerably in their response to soil conditions, Purple Pershore being very sensitive and Belle de Louvain much less so. The number of soil series suitable for apple growing is more limited than for plums, for the heavy Evesham clay is too poorly drained, and the light soils of the Pershore series have too low a nutrient status. Cherry growing is mainly restricted to the lower slopes of Bredon Hill and the Cotswolds, where deep, well-drained loams occur. The diversity of soils in the district is great.

916. BATJER, L. P., AND THOMPSON, A. H.

Three years' results with chemical thinning of apples in the Northwest.
Proc. Amer. Soc. hort. Sci., 1948, 52: 164-72,
bibl. 5.

Under the conditions of these trials in Washington State Elgetol seemed to be the most consistent and effective of the substances used.

917. EDGERTON, L. J.

Peach fruit bud hardness as affected by blossom thinning treatments.
Proc. Amer. Soc. hort. Sci., 1948, 52: 112-14,
bibl. 5.

Chemical blossom thinning of peach trees in New York State in 1946 and 1947 was found to increase the hardness of the fruit buds the following winters.

918. MITCHELL, A. E., TOENJES, W., AND HAMNER, C. L.

The use of dusts and concentrate sprays to prevent pre-harvest drop of McIntosh apples.
Quart. Bull. Mich. agric. Exp. Stat., 1948,
31: 160-4, bibl. 3.

Summarizing their experimental results the authors state: "The concentrated applications of naphthalene acetic acid in concentrations of 37.5 p.p.m. and 100 p.p.m., applied as aerosols, were as effective in preventing pre-harvest drop of McIntosh apples as was the conventional concentration of 10 p.p.m. applied with a hydraulic sprayer. Dry dusts were not so effective, but it is suggested that the effectiveness of the dust may be increased by applying it when the trees are wet, or by applying the dust as a wet dust."

919. GERHARDT, F., AND SMITH, E.

The storage and ripening response of western-grown fruits to post-harvest treatment with growth-regulating substances.
Proc. Amer. Soc. hort. Sci., 1948, 52: 159-63,
bibl. 5.

Apricots, peaches, pears, and apples were immersed immediately after harvest in solutions of 2,4-dichlorophenoxyacetic acid and of the sodium salt of α -naphthaleneacetic acid with 1% of carbowax. No correlation could be established between the rate of ripening and any of the post-harvest or post-storage treatments with growth-regulating substances. The chemicals did not measurably stimulate ripening.—*Wenatchee, Wash.*

920. SMOCK, R. M.

A study of maturity indices for McIntosh apples.
Proc. Amer. Soc. hort. Sci., 1948, 52: 176-82,
bibl. 10.

In an attempt to determine the most suitable methods of measuring the maturity of McIntosh apples that were to be held in cold store until March, ease of separation from the spur, surface colour, soluble solids and days from full bloom were all considered. The best pickings were made just at or just following the beginning of the climacteric rise in respiration. This has little practical application except in experimental studies.

Noted.

921.

a BREGGER, J. T.
Peach variety incompatibilities on seedlings of a Yunnan understock.
Proc. Amer. Soc. hort. Sci., 1948, 52: 141-2.

b BROOKS, R. M.
Seasonal incidence of perfect and staminate olive flowers.
Proc. Amer. Soc. hort. Sci., 1948, 52: 213-18.
Observations made at Davis, Calif.

c BRYDEN, J. D.
Moderate pruning is best [for Granny Smith apples in N.Z.].
Orchard. N.Z., 1948, 21: 6: 20.
Experiments at Bathurst Experiment Farm.

d HIBARD, A. D.
The effect of severity of pruning on the performance of young Elberta peach trees [under Missouri conditions].
Proc. Amer. Soc. hort. Sci., 1948, 52: 131-6,
bibl. 6.

e KARNAZT, H.
Die Behandlung des Obstsaatgutes von der Ernte bis zur Aussaat. (The treatment of fruit seed from harvest to planting.)
Mitt. ObstbVersuchsr. Jork, 1948, pp. 61-3,
65-6.

f LOEWEL, E. L.
Unsere Birnenschau 1947. (Pear exhibition 1947.)
Mitt. ObstbVersuchsr. Jork, 1947, No. 12,
pp. 1-4.

g LOEWEL, E. L.
Wünsche des Obstbaues an die Technik. (Desirable technical developments in fruit-growing.)
Mitt. ObstbVersuchsr. Jork, 1948, pp. 17-24.

h LOEWEL, E. L.
Pfauen- und Zwetschen-Ausstellung in der Obstbauversuchsanstalt. (A plum and zwetschen exhibition at Jork research station.)

Mitt. Obstb. Versuchsr. Jork, 1948, pp. 73-7.
Comments on the varieties exhibited.

i LOEWEL, E. L.
Veredlungsmöglichkeit von Birnen auf Eberesche. (The working of pear on mountain ash.)
Mitt. Obstb. Versuchsr. Jork, 1948, pp. 93.
Quite unsuccessful.

j MINNESOTA STATE HORTICULTURAL SOCIETY.
Fruits recommended for planting in Minnesota, 1949.

Minn. Hort., 1949, 77: 11.

k SCHEIL, W.
Die Verjüngung unserer alten Süßkirschenbestände. (The rejuvenation of cherry orchards [by pruning].)
Mitt. Obstb. Versuchsr. Jork, 1947, No. 17, pp. 1-3.

l STAFFORD, E. M., AND BARNES, D. F.
Biology of the fig scale in California.
Hilgardia, 1948, 18: 567-98, bibl. 19, illus.

SMALL FRUITS, VINES AND NUTS.

Small fruits.

(See also 738, 750, 842, 843.)

922. HARRISS, R. W.
The best soft fruit varieties for quick freezing,
Fruitgrower, 1948, 106: 763-4.
On the results of tests made at the Campden Research Station and elsewhere, recommendations are made of the soft fruit varieties most suitable for the quick freeze process. Good colour, pronounced flavour and firm flesh are desirable qualities. The raspberries Norfolk Giant and Lloyd George, the blackcurrant Baldwin, and the gooseberry Careless have so far been found the most satisfactory varieties, although some others do well. None of the well-known strawberry varieties combines all the necessary qualities, but some of the new Cambridge seedlings gave promising results.

923. LAPONTE, J.-A.
La conservation des petits fruits par le froid.
(Preservation of small fruits by freezing.)
Rev. d'Oka, 1949, 23: 16-36, bibl. 57.

The first part of this article contains information on the varieties of strawberries, raspberries and cranberries from various parts of the United States and Canada, most suitable for preservation by freezing, and the stage of maturity at which they should be picked. It is becoming increasingly recognized that choice of variety depends to some extent on the region of production.

924. SCHULTZ, F.
Versuche über den Schnitt zu Beerenobst.
(Pruning trials with small fruit.)
Ceres, Hamburg, 1949, 2: 1: 3-7, bibl. 3.

A report is presented on pruning trials with red currants and gooseberries, carried out at the Institut für Obstbau, Berlin-Dahlem, from 1938 to 1944 with bushes planted in 1936. The varieties used were the Red Dutch currant and Rote Triumphbeere gooseberry. Three treatments were compared: (1) no pruning, (2) thinning out, and (3) heading back. With regard to yields treatments (1) and (2) were superior to (3) during the first 4 years, but during the following 2 years the difference fell below the significance level. In gooseberries the unpruned and thinned bushes showed symptoms of die-back and partial fruit drop, and in the more vigorous Red Dutch currant a tendency to exhaustion was also seen. Differences in quality are very marked in gooseberry from the second year

onward, the number of berries per kg. from (1) and (2) bushes being 53-194% higher than that from more severely pruned plants. In currants the effect of pruning on quality did not appear so early and it remained somewhat less pronounced. It was found that in currants the additional time spent on the more severe pruning treatment was more than compensated for by a reduction in picking time on those bushes. This was not true in the case of gooseberries, but the higher quality achieved and the closer planting distance possible should make heading back an attractive proposition. In general a combination of treatments (2) and (3) may be advisable.

925. WATT, J. H.
The growing of cape gooseberries. Present demand exceeds supply.
N.Z. J. Agric., 1948, 77: 377-82, illus.

A plea is made for extending the cultivation of the Cape gooseberry (*Physalis peruviana*) in New Zealand. It will grow on relatively poor soils and areas may be established where it comes into production the first year. It is a perennial of bushy habit but is usually treated as an annual in commercial plantings. Notes are given on cultural operations including propagation, harvesting and the control of pests and diseases.

926. WARD, K. M.
Cape gooseberry growing.
Qd agric. J., 1948, 67: 258-60.

Two types of this fruit are grown in Queensland, a yellow, small-fruited variety and the larger Golden Nugget (probably the variety *edulis*). The former is superior in flavour. Information is given on climatic and soil requirements, propagation, planting out, manuring, harvesting, marketing, diseases and pests. Although a perennial, the plant is usually grown as an annual in Queensland. Under good conditions crops of 3,000 lb., or more, per acre are obtained.

927. EATON, E. L., HARRISON, K. A., AND MAXWELL, C. W.
The cranberry.
Fmrs' Bull. Dep. Agric., Canada, 151, 1948, pp. 35, illus.

The consistently unsatisfied demand for cranberries shows that there is opportunity for great expansion in the cranberry industry in Canada. Although the two commercially grown species of *Vaccinium* are native there, they need very specialized conditions of bogland with a controlled water level. In this pamphlet,

written for the grower, commercial practices are described in detail, including the preparation of bog land, dyking, sanding, flooding and weed control. There are also notes on the choice of a suitable pumping outfit, on the cost of constructing a bog, and on pests and diseases. Although flooding is the traditional method of protecting the vines against frost, sprinkler systems are now being installed on many bogs where the water supply is too small for flooding. These have the advantage of checking the frost the moment the water is turned on, and picking can be resumed more quickly after danger is past.

928. SWARTWOUT, H. G.

Growing gooseberries and currants.

Circ. Mo. agric. Exp. Stat. 327, 1948, pp. 12, illus.

A practical and up-to-date pamphlet, intended mainly for use by the private gardener and smallholder. Recommendations are made of varieties and methods of culture suitable for the Missouri district, where hot, dry conditions make these crops difficult to grow.

929. JASINSKI, JA. M.

Far East jianes. [Russian.]

Nauka i Žizn' (Science and Life), 1948, No. 1, p. 37.

An account of lianes occurring in the Amur forests of Siberia, particularly of two species of *Actinidia*. The fruit of *A. kolomikta* is used by the inhabitants of those regions for making jam and wine. Its vitamin C content is about 9,000 mg. per kg. of fruit. The other species, "Limonik", contains an aromatic, rather acid substance tasting rather like lemon. The fruit is considered by the Chinese to have medicinal properties, and by the Amur forest dwellers to be a stimulant; recent investigation has shown that it is of clinical value. The Amur grapevine, which grows in the clearings, is also mentioned.

930. DARROW, G. M., AND WALDO, G. F.

Raspberry culture.

Fmrs' Bull. U.S. Dep. Agric. 887, 1948, pp. 38, bibl. 1, illus.

The cultivation of raspberries has become a specialized business in those parts of the United States where they are grown as the main commercial crop. Here is an account of the various commercial methods used in those districts. The relative advantages of the hill, linear and hedge systems of training are discussed. Maintenance of soil moisture is important, and local practices vary from constant tillage and applications of humus to the use of cover crops, mulches and, in the arid districts of the Pacific coast, irrigation. Red, black and purple varieties are grown extensively, and descriptions of the best commercial varieties of each are given. Although it is stated that virus diseases have been partly responsible for the recent decline in raspberry production, cultural methods have apparently not been determined by consideration of virus control. The planting of clean, certified stock is recommended, but many growers regularly propagate their own. The reader is referred to *Farmers' Bulletin* 1488 for information on raspberry diseases.

931. LOREE, R. E.

Raspberry growing in Michigan.

Ext. Bull. Mich. St. Coll. Ext. Serv. 287, 1948, pp. 39, illus.

This revised edition of *Circ. Bull.* 152 of the Michigan Agricultural Experiment Station gives a brief survey of the raspberry growing industry in Michigan. Commercial methods of cultivation, systems of planting, and disease control programmes are discussed, and notes are given on the most widely grown commercial varieties.

932. BAILEY, J. S.

A study of the rest period in red raspberries.

Proc. Amer. Soc. hort. Sci., 1948, 52: 265-70, bibl. 7.

The position observed as affecting the varieties Chief, Latham, Milton, Taylor, Marcy, and Washington. Chief is found outstanding in its ability to enter deep rest and emerge slowly.

933. VAN DER HELM, G. W.

De teelt van aardbeien onder glas. (Strawberry culture under glass.)

Tuinbouw, 1949, 4: 8-11, illus.

A general account of strawberry culture under glass in Holland with details of the operations in the districts where it is most practised. Varieties suitable for forcing are mentioned, Deutsch Evern being generally preferred. The plants are mostly grown under single or double frames and sometimes short-day treatment is applied. The first ripe strawberries are picked early in April; they are packed for marketing in cardboard boxes with a layer of paper wool at the bottom.

934. REID, R. D.

Breeding strawberries for disease resistance.

Agriculture, 1949, 55: 476-82, bibl. 22.

During the past 30 years there has been a serious decline in the acreage under strawberries in Britain, largely because of root rots, virus diseases and bud eelworm. The most serious form of root rot, caused by *Phytophthora fragariae*, is known here as red core, in U.S.A. as red stele. The most promising approach to the red core problem lies in the production of resistant varieties. Extensive breeding with this objective is now in progress in the U.S.A., Canada, and Britain. This article is mainly a review of the writer's work on the problem at Auchincruive, S.W. Scotland, prefaced by a short account of strawberry eelworm and virus diseases. A statement is made regarding the Auchincruive varieties released to date, of which the latest is Auchincruive Climax, released in 1947. Its parentage and characteristics are given.

935. OVERCASH, J. P., AND MCWHIRTER, L.

The ascorbic acid content of nine strawberry varieties in Mississippi.

Proc. Amer. Soc. hort. Sci., 1948, 52: 251-6, bibl. 12.

Analysed weekly for 4 weeks, the seasonal average ascorbic acid content of 9 strawberry varieties in Mississippi ranged from 43.39 to 66.71 mg. per 100 g. of fresh berries.

936. RAPHAEL, T. D.

Strawberry growing. Cultural notes and recommendations.

Tasm. J. Agric., 1949, 20: 32-9, illus.

The Tasmanian Department of Agriculture, by importing and propagating selected stocks from overseas,

and by the re-selection of local strains, is encouraging the extension of strawberry growing in the island. Cultural notes are given on situation and soil, propagation, planting, spacing, cultivation, harvesting (for local markets and for export trade), manuring, and varieties. For processing Ettersburg Tree is the leading variety: it is vigorous, productive, hardy, and is definitely tolerant to virus infection. For this reason it should never be planted in beds adjacent to those of the very susceptible Royal Sovereign, which is the leading dessert variety.

Vines.

937. CHRISTENSEN, J. B.

Determinacion de parcelas experimentales para viñas. (A vine uniformity trial.) [Brief summaries in English, French and Italian.] *Experimenta*, Mendoza, 1948, 1: 20-5, bibl. 8.

A vine uniformity trial in an irrigated vineyard of the Mendoza Province of Argentina is described and the following results are given: There is a definite advantage in the use of plots of large size, 12 to 16 plants. For practical reasons the plots should consist of only one row. The covariance method offers the possibility of correcting for the number of missing plants, and when applied in a smaller Standard Error. [Author's summary.] [The author, as stated in the paper, was assisted by staff at East Malling, Kent, England.]

938. OBERLE, G. D.

Concord still leads the list.

Amer. Fruit Gr., 1949, 69: 1: 21, 45.

A discussion of new vine varieties grown in the eastern United States.

939. ORAMAN, N.

Cavus üzümünün vatani, ampelografisi ve biyolojisi üzerinde bir araştırma. (The Cavus grape variety.) [German summary 1 p.]

T.C. Yüksek Ziraat Enstitüsü, Ankara, No. 114, 1941, pp. 12, bibl. 7 [received 1949].

The origin of the Cavus grape is discussed. This variety is said to be an ideal table grape. It is morphologically bisexual, physiologically female, and requires pollination by another variety.

940. BASTELEUS, R.

Kennismaking met de "Muscat d'Alexandrie". (The Muscat of Alexandria grape.) *Cult. Hand.*, 1949, 15: 22-4, illus.

The variety and its culture are described, and data obtained at the School for Grapes and Fruit Tree Growing of La Hulpe, Belgium, regarding size and weight of bunches and of berries over a number of years, are tabulated.

941. BASTELEUS, R.

Enkele wetenswaardigheden over de "Frankenthal". (Information about the Black Hamburg grape.)

Cult. Hand., 1948, 14: 637-9, illus.

The synonymy of the Frankenthal or Black Hamburg variety is given and the characters of the variety are described, data being tabulated, with cultural notes.

942. ANTONIADES, P. C.

Grape growing for wine production [in Cyprus].

Leaflet. (Educ. Ser.) Cyprus Dep. Agric. 19, 1947, pp. 4 [received 1949].

Mainly concerned with the varieties of grapes grown, but also includes some production figures and notes on the future of the industry in Cyprus.

943. ORAMAN, N.

Orta Anadolu kurak mintakası bağcılık. (Viticultural regions of Anatolia.) [German summary 2 pp.]

T.C. Yüksek Ziraat Enstitüsü, Ankara, No. 121, 1941, pp. 80, bibl. 32, illus. [received 1949].

The characters of the berries and branches of 73 varieties of grapevine are described and the distribution of these varieties in the 9 vilayets is indicated.

944. LE ROUX, M. S.

Planning a new table-grape vineyard [in S. Africa].

Fmg S. Afr., 1948, 23: 825-8, illus.

The following major considerations are discussed.

Ripening time: This varies with district, as well as with variety. The main crop ripens during February and March, when the market is often over-supplied. The grower who can market his grapes during January or early February, or else towards the end of April or later, is therefore at an advantage. Soil: This should be at least 2-3 ft. deep, and provided with adequate moisture, preferably supplemented by irrigation. Spacing and trellising: Where conditions are very favourable the overhead trellis, with vines 12×12 ft. to 20×20 ft. apart, is recommended. Where conditions do not allow of this type, a slanting trellis can be used, if wind-direction and topography allow. Such a trellis has a leaf canopy, 4-5 ft. wide, resting on 6 or 7 wires, a considerable improvement on the old 3-strand Perold trellis. With the slanting trellis, vines may be spaced from 9×5 ft. to 10×10 ft. Varieties: Barlinka, Waltham Cross and Alphonse Lavalée top the list of export varieties and together furnish 80% of the Union's shipments abroad. They are followed by Almeria, Hanepoot (very popular in S. Africa) and New Cross. The merits and characteristics of the different varieties are discussed.

945. LEVADOUX, L.

Note sur la viticulture du département de la Corse. (Viticulture in Corsica.)

Prog. agric. vitic., 1948, 130: 250-9.

The vineyards of Corsica, that in 1929 occupied only about 6,000 ha., could be increased 3 or 4 times. The reasons why they have not been extended are that Corsica is separated from the mainland, and lacks labour, capital and plant nurseries, and the growers have not seriously exploited the possibilities or attempted to produce the types of wine that are required by the home and foreign markets. The rootstock most used in Corsica is Rupestris du Lot, propagated generally from shoots. The varieties cultivated are described.

946. HURIEZ, H.

Le vignoble nantais. (Vine growing in the Nantes area.)

Ann. agron. Paris, 1948, 18: 528-46, bibl. 5.

A discussion of the Muscadet Sèvre et Maine, a high quality vine that has been underrated, and of vine growing in the Nantes area which specializes in its production.—Station Agronomique de Nantes.

947. MARIMAN, G.

Viticulture en plein air. (Open-air viticulture [in Belgium].)

Curr. hort., 1949, 11: 107-9, 185-7, illus.

An account of growing grapes in the open under Belgian conditions with short descriptions of suitable varieties. Observations in two experimental vineyards in Belgium are recorded. Trials in England at Wisley and at Oxted in Surrey, are mentioned, and notes are given on the vine harvest in Alsace and on the institute for viticulture at Colmar, in Alsace.

948. BASTELEUS, R.

Les raisins de serres en Belgique. (Glasshouse production of grapes in Belgium.)

Rev. hort. Paris, 1948, 120: 322-3, illus.

A short account of the development of the industry round Hoeilaart in Belgium, with notes on modern methods of culture and the main varieties grown. Belgium is the only country in which a succession of table grapes can be maintained throughout the year.—L'Ecole d'Horticulture et de Viticulture de la Hulpe (Belgium).

949. DE WILDE, J.

Phaenologische en klimatologische waarnemingen in kassen. (Phenological and climatological observations in glasshouses.) [English summary $\frac{1}{3}$ p.]

Meded. Dir. Tuinb., 1948, 11: 729-42, bibl. 5, illus.

Quantitative phenological observations in Dutch vineyards, together with temperature recordings in three different locations, carried out on the variety Black Alicante, are described. The results are shown in graphs. In general, buds of the bottom horizontal cordons, or the parts of vertical cordons at the same height, are the last to open. At the east side of a cold house running north and south the buds open sooner at the south than at the north end.

950. HOŠTARIJA, S. G.

Progress in viticulture in the central zone of the U.S.S.R. [Russian.]

Sad i ogorod (Orchard and Garden), 1949, No. 2, pp. 25-30.

The author describes the measures that are being taken to extend the cultivation of the grapevine from the southern regions to the more northerly areas of the U.S.S.R. with special reference to the winter-hardy varieties raised by Mičurin, and to the Mičurin central genetical laboratory, where such varieties are propagated for distribution. In 1947 the areas under vines in the central zone occupied 322 ha. Some of the 100 varieties grown are late in ripening and are not hardy, but two varieties which appear suitable for this zone are Malengr Rannii and Madeleine Angevine. Mičurin's varieties at present occupy only 4.6% of the vinegrowing area. The use of windbreaks is recommended. The problems of the scientific institutes in the region are to organize the propagation of those Mičurin's varieties which are hardy and fruitful and

to continue to raise new varieties adapted to the conditions in the various regions.

951. PIROVANO, A.

Le uve da tavola. (Some essentials of table grape production in Italy.)

Ital. agric., 1948, 85: 683-9.

The famous breeder of table grapes notes the necessity for giving the requisite cultural attention demanded by particular varieties to achieve their best results and he feels it no less essential to study the customer's wishes. And since the customer wants uniformity, it is easy enough to give it him at a reasonably high level of excellence in the varieties Regina, Pergolana, Baresana, Colombana, Zibibbo and Italia. The author goes on to discuss the slow but sure progress made by many of the crosses introduced by him at the Grotta Rossa Institute near Rome in the years before the war and now distributed over the vinegrowing world.

952. CAPUCCI, C.

Alcune osservazioni sull'innesto erbaceo per copulazione semplice dell'internodo della vite. (Notes on a simple method of grafting vines at an internode.)

Riv. Fruttic., 1940, 4: 65-96, bibl. 8, illus. [received 1948].

A comprehensive account of a high grafting method used successfully in northern Italy, with notes of varieties which respond favourably.

953. MARTINEZ ZAPORTA, M.

Seis años de experiencias sobre enraizamiento de portainjertos. (Six years' experiments on the rooting of [vine] rootstocks.) [Summary in French, English and German.]

Bol. Inst. nac. Invest. agron. Madrid, 1948, 18: 1-140, bibl. 9, illus.

The results are given of the application of growth substances to cuttings of vine rootstock varieties which root with difficulty (hybrids of Berlandieri). The use of rather high concentrations (333 and 150 p.p.m.) of α -indole-3-acetic acid and of indole-3-butyric acid were harmful, while medium (90-60 p.p.m.) and very low (30 p.p.m.) concentrations had no marked effect. Potassium permanganate, at 1/200 mol., increased the number of rooted cuttings but only in heavy soil.—Estacion de ampelografia y viticultura, Madrid.

954. FAUVERT, M.

Essais de chauffage électrique pour les greffes-boutures de vigne. (Electrical heating for the propagation of vines by grafted cuttings.)

Rev. hort. Paris, 1948, 120: 314-17, illus.

By using electricity instead of coal to heat the propagating frame in which vines were grafted and the stock rooted, the cost of fuel and labour was considerably reduced and the temperature more easily controlled. Union took place within 8 days, and bud development was rapid and uniform. Electricity was used only at night, and the total consumption needed to propagate 10,764 grafts was 209 kWh. A specially constructed propagating box was used inside the frame, as it was found that grafts rooted directly in the soil of the frame were less successful. This may have been due to the proximity of the roots to the cables. The construction

of the propagating box, care of the grafts and details of electrical equipment are described.

955. BRANAS, J.

Sur la longueur des tiges. (On the length of vine stems.)

Progr. agric. vitic., 1948, 130: 277-9.

The author discusses the advantage of training vine stems for some distance above but near the surface of the soil in order that they may receive heat radiated from the ground. Cultural operations are not hindered, certain diseases are checked, and frost damage is avoided.

956. DU PLESSIS, A. M.

Summer treatment of vines [in S. Africa].

Fmg S. Afr., 1948, 23: 801, 816.

A short description of the following practices: the removal of superfluous minor shoots (pre-thinning), the topping and tying of shoots, ringbarking. The last operation is said to prevent non-setting, to encourage the development of large berries, and to ensure earlier ripening.

957. PEYER, E.

Die "Wädenswiler Rebenringe". (The Wädenswil vine ring.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 2-6.

A simple device has been developed at Wädenswil, which greatly facilitates the tying of vines and reduces the time needed for the operation by more than half. It is a clip easily made at home from a 35 cm. piece of galvanized steel wire. Application and manufacture are illustrated.

958. SCHELLENBERG, A.

Prinzipielles zum Schnitt und Erlesen des Blauen Burgunders. (Winter and summer pruning of the Blue Burgundy vine.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 59-62.

In a 3-years' trial carried out in the communal vineyards of the Swiss village of Unter-Stammheim, normal and more severe pruning was compared in the vigorous Blue Burgundy vine growing on fertile soil. The results were distinctly in favour of the normal pruning method according to which 8-12 shoots are left per vine, or 15 in exceptional cases. In summer 3-5 leaves should be left above the last grape on each shoot pruned. The planting distance is 1 m. square, and the stakes should be at least 2-20 m. long.

959. MAUME, L., AND DULAC, J.

Nouvelles observations sur la nutrition de la vigne contrôlée par l'analyse chimique de la feuille. (On the nutrition of the vine as indicated by chemical analysis of leaves.)

C.R. Acad. Agric. Fr., 1948, 34: 861-4.

By chemical analysis of the leaves the requirements of the vine in terms of N, P₂O₅, and K₂O can be determined, and compensation made for any deficiencies.

960. LOTT, W. L.

Magnesium injection in Muscadine grape vines.

Proc. Amer. Soc. hort. Sci., 1948, 52: 283-8, bibl. 14.

The injection of magnesium sulphate in solution into Muscadine grape vines in amounts supplying 9 to 59 g. per vine, prevented the development of chlorosis.

961. STOEV, K. D.

Synthesis and decomposition of starch in the grapevine. [Russian.]

Biohimija, 1949, 14: 1: 5-13, bibl. 44.

From the data obtained it is concluded that the synthesis and decomposition of starch in the grapevine proceeds as follows: monoses → saccharose → starch → maltose → monoses. The links in this scheme are not irreversible.

962. RODRIGUES, A.

O espaço tridimensional em filometria. Sobre o registo e transformação das observações filométricas na *Vitis vinifera L.* (The three dimensional space in phyllometry. The recording and transformation of phyllometrical observations in *Vitis vinifera L.*) [English summary 1 p.]

Agron. lusit., 1945, 7: 363-75, bibl. 2, illus. [received 1949].

This paper shows a practical way of obtaining a complete and exact representation of the shape and planimetry of the vine leaf.

963. GAROGLIO, P. G.

Medidas refractometricas para determinar la variacion del contenido azucarino en las distintas zonas del grano de uva durante el periodo de madurez. (The determination of sugar content in the different layers of the grape during ripening, by means of a refractometer.) [English summary.]

Experimenta, Mendoza, 1948, 1: 5-19, bibl. 13, illus.

The value of the optical mustmeter [refractometer] for the study of the ripening process in grapes is stressed. In experiments carried out at the National University of Cuyo, in which this instrument was used to measure the sugar content of the various layers of must, the author found that the pulp directly round the pips of the grape was richest in sugar, while the rest of the pulp was even poorer than the layer beneath the skin. These results are not in accordance with those of other workers, and may only apply to the grapes of the Cuyo region during the 1948 season.

Nuts.

964. PANTANELLI, E. G.

La data di fioritura del mandorlo in rapporto all'andamento meteorico. (The date of flowering in the almond in relation to season.)

Mem. Staz. agrar. sper. Bari 34, being *Pubbl. 232*, 1940, pp. 48, illus. [received 1949].

Observations in southern Italy show that the three factors most important for the date of flowering in the almond are (1) autumn rains necessary for the swelling of the buds, (2) temperature during growth of buds—frost retarding progress, and (3) light conditions during the growth of the buds. The effect of light is greater than that of cold in floral rather than in leaf buds and it is found that late frosts have a worse effect on the leaf than on the floral buds. The effects of these factors on the influx into the buds of nutrient substances is also noted.

965. McDANIEL, J. C., BALCKMON, G. H., AND BRISON, F. R.
Chestnuts, black walnuts and pecans.
Amer. Fruit Gr., 1949, 69: 1: 24, 37, 50, 51.
 A discussion of new chestnut and black walnut varieties in the northern United States and of pecan varieties in the south-east and in Texas.

966. MANNING, W. E.
The morphology of the flowers of the Juglandaceae. III. The staminate flowers.
Amer. J. Bot., 1948, 35: 606-21, bibl. 39, illus.
 The staminate flowers of all 7 genera of the *Juglandaceae* are described, and the evolutionary position of the genera discussed.—Bucknell University, Lewisburg.

967. EVREINOFF, V. A.
Le pacanier (*Carya olivaeformis* Nuttal). (The pecan.)
Rev. int. Bot. appl., 1949, 29: 315-16, 58-64, bibl. 1.
 Includes notes on origin, characters, natural habitat, propagation, yield, varieties, cultivation, grafting, diseases, and enemies.

968. DONNO, G.
Il pistacchio. (The pistache, economic and industrial aspects of its cultivation in Italy.)
Ann. Fac. Agrar. Portici, 1941/42, 13: 175-232, bibl. 152 [received 1948].
 While the article itself deals almost exclusively with the commercial aspects of pistache production in Italy, where it is confined to Sicily, the author gives a comprehensive list of references, mainly Italian and French, which should facilitate a detailed study of its cultivation.

969. GLENN, E. M.
Interested in walnuts?
Fruitgrower, 1949, 107: 287-8.
 A note on some of the cultural problems of walnut growing in England, including fruit drop and frost damage.

970. VAN DER PLASSCHE, A. W.
De betekenis van de notenteelt. (The importance of the walnut.)
Fruiteelt, 1948, 38: 844-5, illus.
 This article discusses walnut growing in Holland, with notes on grafting. The quantities of walnuts imported into that country from 1930 to 1941 are quoted. The importance of raising trees of good quality is stressed and nurserymen are advised not to be content with chance seedlings.

971. ZARUBIN, A. F.
Different fruits on a walnut tree. [Russian.]
Priroda (Nature), 1948, No. 12, p. 60, illus.
 An old walnut tree on a trial plot on the Kirghiz experiment station bears nuts of two kinds. On one large branch, which arose as a "bud variation", the nuts are smaller than those on the rest of the tree, their quality is poorer and shell harder. This branch is protandrous while the rest of the crown is protogynous.

972. WOKES, F., AND MELVILLE, R.
Vitamin C in the walnut (*Juglans regia*).
Biochem. J., 1948, 43: 585-92, bibl. 15.
 Studies on samples of different tissues collected during three seasons from *Juglans regia* trees growing in several districts round London showed, in the endocarp, remarkably high concentrations of vitamin C, which may be used in lignification. This vitamin C probably originates mainly in photosynthetic centres in the leaves. Examination of the intervening tissues showed that physiological conditions (acidity, concentration of enzymes and of vitamin C) militate against translocation of vitamin C as such from leaf to nut. The experimental findings favour an alternative hypothesis, which will be considered later. [Authors' summary.]

973. WHITEHOUSE, W. E., AND JOLEY, L. E.
Notes on the growth of Persian walnut propagated on rootstocks of the Chinese wing-nut, *Pterocarya stenoptera*.
Proc. Amer. Soc. hort. Sci., 1948, 52: 103-6, bibl. 4.
 Observations were made on the growth of Persian walnut varieties budded on *Juglans hindsii* and on *Pterocarya stenoptera* at the U.S. Plant Introduction Garden, Chico, California. Two trees of the Sorrentino variety budded respectively on the above stocks show good growth in both instances. That on *P. stenoptera* was some 25 feet high at the end of 8 seasons' growth. Overgrowth at the union is in favour of the rootstocks in each case, but is considerably less on *Pterocarya*.

974.

- a BRIGHTWELL, W. T.
Propagation of the Rabbiteye blueberry.
Proc. Amer. Soc. hort. Sci., 1948, 52: 289-93, bibl. 8.
 Preliminary conclusions only.—Tifton, Ga.
- b FRANKLIN, H. J., AND CROSS, C. E.
Weather in relation to cranberry production and condition [in Massachusetts].
Bull. Mass. agric. Exp. Stat. 450, 1948, pp. 16, bibl. 22.
- c HAYES, K. M., FELLERS, C. R., AND ESSELEN, W. B., Jr.
The keeping quality of "pre-packaged" fresh cranberries.
Proc. Amer. Soc. hort. Sci., 1948, 52: 257-62, bibl. 7.
 Keeping qualities poor under all conditions tried.
- d HESSE, C. O.
California has five new [grape vine] varieties.
Amer. Fruit Gr., 1949, 69: 1: 21.
- e MCCARTNEY, J. S.
A study of the effects of α -naphthaleneacetic acid on prolongation of rest in the Latham raspberry.
Proc. Amer. Soc. hort. Sci., 1948, 52: 271-5, bibl. 9.
 Useful prolongation not achieved.

f ORAMAN, N.
Bağcılık. (Viticulture.)
T.C. Yüksek Ziraat Enstitüsü, Ankara, No. 20, 1945, pp. 149, bibl. 18, illus. [received 1949].

g PEYER, E.
Jahresbericht 1948 über die Tätigkeit der Genossenschaft zur Produktion von amerikanischem Unterlagenholz im Inland zur Rebsveredlung [Unterlagengenossenschaft]. (Annual report of the co-operative society for the production of American vine stocks in Switzerland, 1948.)
Schweiz. Z. Obst- u. Weinb., 1949, **58**: 109-14.
For particulars of the scheme see *H.A.*, 16: 1854.

h SLATE, G. L.
Small fruits of promise [in the United States].
Amer. Fruit Gr., 1949, **69**: 1: 22, 55, 56.

i SONDHEIMER, E., AND KERTESZ, Z. I.
The anthocyanin of strawberries.
J. Amer. chem. Soc., 1948, **70**: 3476-9, bibl. 15, being *J. Art. N. York State agric. Exp. Stat.* **758**.

j YEAGER, A. F., AND RICHARDS, M. C.
A new fall bearing red raspberry, Durham—and the spur blight problem.
Proc. Amer. Soc. hort. Sci., 1948, **52**: 263-4, bibl. 1.
Shows promise in its initial stages.—Durham, N. Hampshire.

PLANT PROTECTION OF DECIDUOUS FRUITS.*

General.

(See also 1651, 1658.)

975. MOORE, W. C.
The incidence of plant diseases in England and Wales.
Sci. Hort., 1949, **9**: 85-97, bibl. 17.

A paper, read in 1946, in which the writer discusses some of the more familiar diseases, showing how their incidence varies with the year and the district, and how they may be influenced by such factors as weather, soil conditions, cultural practice, wartime conditions, application of new knowledge or failure to apply existing knowledge.

976. VAN DER PLANK, J. E.
The relation between the size of fields and the spread of plant-diseases into them. Part II. Diseases caused by fungi with air-borne spores; with a note on horizons of infection.
Emp. J. exp. Agric., 1949, **17**: 18-22, bibl. 4.

Part II makes three points: that making fields larger and correspondingly fewer, without change of shape, aspect, or uniformity of distribution, decreases the movement of fungus spores by air between them; that this decrease is not offset by an increased multiplication of infection within the enlarged fields, provided that they are homogeneous at the start; and that, although some spores travel and remain alive over very long distances, there is in certain circumstances a fairly close horizon of infection about a field, from beyond which a negligible amount of infection is received. Over distances long enough to be appropriate to the movement of infection between fields, the probability of a spore settling and causing infection at a distance x from its source is determined approximately and empirically as $p = k/x^n$, where k is a constant and n , determined from records for dispersal over distances greater than 30 m., has a value of at least 2 and sometimes approaches 4. If fields are made larger and correspondingly fewer, without change in shape, aspect, or uniformity of distribution, the proportion of spores transferred from field to field varies inversely as $A^{1/(n-1)}$ where A is the average area of the field. This gain through enlargement is not offset by increased multiplication within the fields. Irrespective of how far spores can travel, it should be

possible to use this method of enlargement of fields, or any other hygienic measures, on a local scale with partial success, provided $n=3$ or more. [From author's summary. For an abstract of Part I, see *H.A.*, 18: 2522.]

977. MINISTRY OF AGRICULTURE, LONDON.

[Horticultural Leaflets.]

Adv. Leaflets. Minist. Agric. Lond., 1945-1948, 1d. each, mostly illustrated.

The following Advisory Leaflets have been recently received; their serial numbers are quoted for reference: 10, Fruit tree red spider; 13, Apple sawfly; 23, Coral spot; 24, European gooseberry mildew; 25, Vapourer moth; 27, Black currant gall mite; 28, Apple blossom weevil; 34, Plum aphides; 35, Pear leaf blister mite; 36, The mussel scale; 37, Lackey moth; 40, Small ermine moths; 42, The codling moth; 57, Wingless weevils; 63, Blossom wilt of apples; 66, The raspberry moth; 81, Peach leaf curl; 84, Pear and cherry sawfly; 88, The brown scale; 96, Apple sucker; 100, Apple and pear canker; 106, Apple aphides; 129, The loganberry; 151, Fruit tree capsid bugs; 180, Cultivation of raspberries; 187, Woolly aphid; 198, Gooseberry cluster-cup rust; 204, Die-back disease of gooseberries; 207, Powdery mildew of the vine; 215, Gooseberries; 245, Apple and pear scab; 246, Silver leaf disease; 248, Brown rot and allied diseases of plum; 253, Crown gall; 259, Leopard moth; 273, American gooseberry mildew; 277, Reversion in black currants; 305, Gooseberry red spider; 326, Grafting fruit trees; 336, Winter pruning established apple and pear trees.

978. GRAM, E., AND OTHERS.

Plantesygdømme i Danmark 1946. (Plant diseases and pests in Denmark 1946.) [English summary pp. 8.]

Tidsskr. Planteavl., 1948 (?), **52**: 236-92.

The survey, which includes potatoes, horticultural crops and ornamentals, was carried out by Statens Plante-patologiske Forsøg. *Alternaria grossulariae* has been recorded for the first time in Denmark. Non-pathogenic diseases are also discussed.

979. MOORE, W. C.

New and interesting plant diseases.

Trans. Brit. mycol. Soc., 1949, **32**: 95-9.

This series of notes on plant diseases is continued with

short accounts of four diseases, with these serial numbers and titles: 33. Leaf blotch of geum (*Zythia fragariae* Laibach). A hybrid geum in a nursery bed at Harpenden bore pycnidia of *Zythia fragaria* previously recorded in this country as causing a leaf blotch of strawberry. [H.A., 12: 118; 15: 101.] 34. Downy mildew on *Alyssum saxatile* (*Peronospora galligena* Blumer). On plants raised from seed sown rather thickly in shaded beds under glass in May. 35. Downy mildew of the vine (*Plasmopara viticola*). Records of its occurrence in this country, the latest being in 1947 on a Teinturier grape, *Vitis vinifera* L. var. *purpurea* growing in a garden at Yalding, Kent. 36. Pre-storage black heart in potato tubers. This disorder is not invariably a storage disease, but one that under special conditions may occur immediately after digging or even while the tubers are still in the ground. Temperature is a controlling factor, though there is obviously a close relation between the development of black heart, temperature, time of exposure, and oxygen supply.

980. DUNIN, M. S.

Immunity of plants to disease. [Russian.] *Nauka i Ziznj* (Science and Life), 1948, No. 6, pp. 18-23, illus.

The author discusses acquired and inherited immunity in relation to breeding resistant plants, and describes a serological method of testing plants for immunity. Reference is made to "drop" and viscometric methods for the analysis of viruses and other substances, but no details are given.

Nutritional disturbances.

(See also 793, 794, 960.)

981. GUYON, G.

Sur le déperissement du pommier de pré-verger dans le Massif Central. (The decline of apple trees under grass in the Auvergne.) *Ann. agron. Paris*, 1948, 18: 593-606, bibl. 6.

Three years' manurial experiments confirmed the earlier diagnosis by leaf analysis that the decline of apple trees under grass in the Auvergne is due to nitrogen deficiency. The trees recovered when the nutrient was supplied in a suitable manner. Three methods of applying fertilizers to the root zone were used, two of which are still under trial: (1) by soil injection; (2) through 30-40 cm. deep holes; (3) by removal of turf. *Holes.* Instead of employing the usual crowbar method, which is laborious and applicable only after rain or irrigation, the author had a number of 30-40 cm. deep holes dug under the spread of the branches. These holes were filled with manure, straw or other organic material up to three-quarters of their depth and the fertilizer was placed on top as required. It is necessary to replace the organic material from time to time as it decomposes. Once the holes are dug, little further manual labour is needed. *Removal of turf* (fumure par plaques). Squares of turf are removed around the tree to a depth of up to 15 cm. The sod is replaced by straw or other organic material. This method has the advantage that it does not interfere with the mechanical cutting of the grass. Instead of straw the author used peat reinforced by mineral fertilizers. The peat was then watered repeatedly with a solution

of ammonium sulphate. A single square of 2 m² has restored the vigour of the trees in two cases within two years, but further experiments are necessary to determine the best size of square to remove and the long-term effect of the treatment. It is thought that both methods are of interest as a substitute for the fertilizer lance.

982. HALLEMANS, A.

Quelques maladies de carence de nos essences fruitières. (Some deficiency diseases of fruit trees.)

Cour. hort., 1949, 11: 110-11, illus.

The symptoms of potassium, magnesium and manganese deficiencies are described and illustrated, with recommendations for control.

983. ROUJANSKY, G.

Sur quelques expérimentations de sels ferreux dans la lutte contre la chlorose calcique du pêcher. (Trials with ferrous salts for the control of lime-induced chlorosis of peaches.)

C.R. Acad. Agric. Fr., 1948, 34: 981-3.

Successful results in the control of lime-induced chlorosis of peach were obtained with sesquitartrate of iron and potassium applied to pruning cuts at 0.26% and placed in holes in the stems and chief branches using 20 g. per tree, and by spraying with 0.5% double sulphate of iron and ammonia.

984. KNOOPPIEN, P.

Het scheuren van kessen. (Cracking of cherries.) [English summary 7 ll.]

Meded. Dir. Tuinb., 1949, 12: 77-8.

Spraying with 0.01% copper sulphate in June when the fruit was lightly coloured, resulted in reduced cracking and *Monilia* infection.

985. SMIT, R.

Kopergebrek bij vruchtbomen. (Copper deficiency in fruit trees.)

Fruitteelt, 1949, 39: 69, illus.

A die-back of apple shoots is attributed to copper deficiency, and applications of copper sulphate are recommended.

986. (CAWTHON INSTITUTE.)

Raspberry "die-back". Suspected boron deficiency.

Cawthon Inst. Bull. 48 [no date, received 1949], p. 1.

A dieback of raspberry canes in New Zealand is attributed to boron deficiency, for applications of boron have given good results. It is recommended that affected bushes should each be given $\frac{1}{2}$ oz. boron, the equivalent of about 40 lb. per acre. For convenience the boron should be mixed with dry sand or soil to give a mixture equivalent to 2 cwt. per acre. Great care must be exercised in using boron, since, in large quantities, it is toxic to many plants.

Climatic factors.

(See also 828g, 859, 910.)

987. HARGRAVE, P. D.

The physiological aspect of cold and winter killing.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 3rd annu. Meet., 1947, pp. 34-8, bibl. 7.

Part of a joint review on hardiness. The following seems to be a plausible concept of frost injury and resistance: As the temperature drops, plants undercool. Undercooling causes no injury until intracellular ice forms. Ice formation fails to occur in some plants however low the temperature. Below -20°C . undercooling permits of vitrification which must be complete, if harm is not to be experienced. Undercooling with intracellular ice formation during the freezing or thawing causes death of the plant. Resistance to ice formation through natural selection has been developed. If a plant cools below its freezing point, ice begins to form from the pure water in the cell wall surfaces. Free water within the cell diffuses out to the centres of ice formation, concentrating the cell sap, whose freezing point is continuously lowered. The cell wall and plasma membrane act as barriers to inoculation by ice crystals and the cell contents undercool. The cell and cell wall, as a result of water loss, shrink. The expansion of water, on becoming intercellular ice, displaces the air from the plant. Dehydration and mechanical strain are then the two possible factors that will permit injury by causing coagulation of the colloidal cell contents, rupturing of the brittle ectoplasm and plasma membrane by stretching during deplasmolysis. Selection has developed plants that (1) show resistance to their protoplasm becoming concentrated on dehydration, and (2) reduce cell shrinkage by having high cell sap concentrations and bound water, low water content and increased quantities of fats, tannins, etc. If intracellular ice is formed, the crystals destroy the structure of the protoplasm. Hardy cells can withstand some of this freezing. The rate of freezing would influence the amount of intracellular ice formation; and the rate of thawing the rate of absorption by the cell. The latter could cause mechanical injury by separation of the protoplast from the cell wall. Rate of diffusion, controlled by the permeability and consistency of the protoplasm, are then the key factors in frost resistance. Secondary factors are: environment, time, cell size, moisture content, percentage of sucrose, fats, anthocyanins and tannins, developmental stage, photoperiod. [From author's conclusion.]

988. HILTON, J. R.

The role of nutrition in winter hardiness.

(Mim.) Rep. Proc. W. Canad. Soc. Hort.,
3rd annu. Meet., 1947, pp. 39-42, bibl. 10.

A digest of scientific work, from which it is obvious that the nutritive condition of a tree, particularly as it reaches or nears the growth phase at which "hardening off" takes place, may be of real importance in influencing winter hardiness. Apart from the effect of fall application of nitrogen under certain conditions, there is no suggestion that any particular element or nutritive compound is of special importance in itself unless it happens to be so deficient as to interfere with the normal growth and development of the plant. It would seem that a rather dry period throughout September and early October would be more effective in promoting hardiness in tree tissues than an ample moisture supply during the same period. This is not always controllable by the cultivator, but could form the basis of hardiness trials in areas where irrigation is used. [From author's discussion.]

989. PATTERSON, C. F.
Methods of developing hardiness and protecting plants against winter killing [in W. Canada].
(Mim.) Rep. Proc. W. Canad. Soc. Hort.,
4th annu. Meet., 1948, pp. 46A-D.

The subject is discussed and the following advice given: Plant in sheltered areas, using extremely hardy and otherwise suitable rootstocks. Provide conditions that will (a) permit at least fair development in the plant, (b) will result in the desired hardiness of its wood and (c) give ample soil moisture during winter months. Give late autumn irrigations where the soil is deficient in moisture. Head woody plants low. Encourage the development of wide crotches. Protect trunks and large branches by whitewash or shading materials. Avoid over-bearing. Use mulches.

990. BABALEANU, P., AND CELAN, M.
Observations sur les effets de la gelée sur quelques variétés de poiriers. (Observations on the effects of frost on certain pear varieties.)
Bull. Éc. polytech. Jassy, 1948, 3: 443-52.

The frost damage caused by the severe winter of 1946-7 was studied on 10 pear varieties in the Jassy region of Rumania. Josephine de Malines alone showed no sign of damage, either externally or microscopically. The varieties Beurré d'Hardenpot, Clapp's Favourite and Virgouleuse showed browning of the phloem and cork tissues, but were sufficiently resistant to make vigorous growth the following season. In Duchesse d'Angoulême, Doyenné d'Hiver, Beurré Diel and Baronine Melo von Schmidt, the tissue was severely damaged, discoloration extending in some cases to the pith; serious frost cracks occurred. Vicar of Winkfield and Louise Bonne d'Avranche suffered irreparable damage; in cases where the cambium survived, growth was malformed and young shoots dried out. In support of the theory that frost resistance is due to the effect of external factors on the physiological processes of the plant, the authors relate the severe frost damage incurred during the season 1946-7 to the warm, wet autumn conditions following an exceptionally dry summer. Varietal resistance is similarly correlated with the vegetative rhythm of the variety. For instance, the three varieties least damaged by frost were those that had ceased growth early in the season.—L'École Polytechnique de Jassy.

991. ANON.
Die Auswirkungen des Winters 1946/47 in den Anzuchten der Baumschule Fr. Beddermann, Schwarmstedt. (The effect of the winter of 1946/47 on young nursery trees.)
Mitt. Obstb. Versuchsr. Jork, 1947, No. 13, pp. 1-4.

Data on frost damage to pome and stone fruit in the nursery, with particular reference to the rootstock.

992. BLAHA, J.
Fenologická pozorování u rybízu se zřetelem na mrazový rok 1929. (Phenological observations on currants during the severe winter of 1929.)
Ann. Czechosl. Acad. Agric., 1947, 20: 421-9
[received 1949].

The author has made use of phenological data, available

for 5 consecutive years, to evaluate the effect of the 1929 frost on the course and duration of growth phases. In red currants the buds burst about a month late, but this retardation had almost disappeared by the end of the flowering period, and the whole vegetative phase, from bud burst to fruit picking, was about the same as in a normal year. The yield was not affected but picking was a little late. Similar results were observed in white and black currants, the frost only shortening certain growth phases. The general effect of the low winter temperatures was to retard bud-break by about 30 days, and to accelerate development during the growing period.

993. ZAHAROVA, E. I.

Winter injury to vine stems in the zone where vines are protected in winter, and measures of avoiding it. [Russian.]
Sad i ogorod (Orchard and Garden), 1949, No. 2, pp. 31-9.

In that zone of Russia where vines are protected in winter, from 43° to 57° north latitude, they are often seriously damaged then. In the northerly areas of this zone the root systems and above ground parts of the European varieties are injured. In the more southerly regions the damage is mostly to the above ground parts only. On sandy soils the root systems suffer most. The damage and its distribution are described. It is stated definitely that the buds of vine stems covered with soil suffer less damage than those left uncovered. The effect of the covering material with reference to its retaining moisture is discussed. A double covering is recommended, of straw, pitched paper or similar material with soil on top.

994. CHAPLIN, C. E.

Some artificial freezing tests of peach fruit buds.
Proc. Amer. Soc. hort. Sci., 1948, 52: 121-9, bibl. 11.

The method adopted in these tests in Illinois are described. Among the findings noted are the following:—The point of greatest hardiness was reached by the fruit buds after the rest period was broken, or near its end. The killing point of peach fruit buds fluctuates directly with the temperature changes during the winter months. The freezing tests made in this study show that the killing point of the fruit buds may rise as much as 11° after a warm period, and that it may fall as much as $5-6^{\circ}$ after a cold spell. The critical range for peach blossoms was found to be $24-26^{\circ}$ F. The more tender varieties were severely injured at the upper limit. At shuck fall the fruit was of about the same degree of hardiness as at bloom.

995. COURSHEE, R. J.

Wind machines to combat [radiation] frost.
Grower, 1949, 31: 111-12.

A popular article explaining the difference in principle between the low-powered, slow moving, horizontal fans under trial by the National Institute of Agricultural Engineering in Britain and the high-speed, vertical fans tried in the U.S.A. [see also *H.A.*, 19: 209].

996. CHEPIL, W. S.

Wind erosion control with shelterbelts in North China.

Agron. J., * 1949, 41: 127-9, illus.

An account of the steps taken by U.N.R.R.A. and the Chinese government in 1947 to reclaim the large areas of sandy land liable to soil erosion, that had formed since the Yellow River last broke through its levees in 1938. The traditional practice, that had been very effectively established in the Kaifeng area, of planting willow shelter belts in a chequer board system was adopted. The value of other systems, such as low bush belts of *Tamarix*, or tall tree belts underplanted with bushes, are discussed, and the work that is being done in tying down active sand-dunes is described. It is suggested that this work in North China might be of interest to those responsible for the planning and care of windbreaks on the American continent.

997. TALBERT, T. J., AND SMITH, J. E.

The multiflora rose as a living hedge fence.
Bull. Mo. agric. Exp. Stat. 517, 1948, pp. 11, illus.

This plant seems to offer a solution to the problem of high fencing costs in Missouri. It is described and instructions are given for raising and establishing it. Its advantages and disadvantages are summarized.

Viruses.

998. CATION, D.

Transmission of cherry yellows virus complex through seeds.

Phytopathology, 1949, 39: 37-40, bibl. 2, illus.

Mahaleb and Montmorency seeds collected from known cherry yellows-diseased trees were grown to seedling stage in the greenhouse and indexed on seedling peach in the field. At least 10% of the Mahaleb seed transmitted ring spot virus and 8.7% the cherry yellows complex. Montmorency seed did not transmit cherry yellows but 30% of the seed carried the ring spot virus.—Dominion Lab. of Plant Pathology, Winnipeg, Manitoba, Canada.

999. CATION, D.

Transmission of viruses through cherry seeds.
Abstr. in *Phytopathology*, 1949, 39: 4.

Evidence was obtained that some of the seed collected from Mahaleb cherry trees apparently infected with cherry yellows virus complex transmitted either ring spot or typical cherry yellows symptoms, while that from Montmorency trees transmitted ring spot only.

1000. ZELLER, S. M., AND MILBRATH, J. A.

Western X-disease of Montmorency cherry and its relation to buckskin of sweet cherry.

Abstr. in *Phytopathology*, 1948, 38: 920.

The little cherry disease of Montmorency cherry when transmitted to sweet cherry causes buckskin, and to peach Western X-disease.

1001. MOORE, J. D., BOYLE, J. S., AND KEITT, G. W.

Mechanical transmission of a virus disease to cucumber from sour cherry.

Science, 1948, 108, 623-4, bibl. 4.

A brief account of what is believed to be the first mechanical transmission of a stone fruit virus disease and the first transmission of a virus disease from sour cherry to a herbaceous host. [A note of this will also be found in *Phytopathology*, 1949, 39: 3.]

* Formerly J. Amer. Soc. Agron.

1002. WILHELM, S., THOMAS, H. E., AND JENSEN, D. D.

A dwarfing virus disease of bramble fruits.
Abstr. in *Phytopathology*, 1948, 38: 919.

The symptoms of a graft transmissible virus disease of brambles, particularly logans, in California are marked dwarfing, weak development of fruit laterals, downward cupping and yellow-bronze colouring of the leaves, premature reddening in autumn and a precocious development of basal buds causing a bunched appearance. The varieties and species of blackberry related to the logan are readily graft inoculated. Tests suggest that raspberry acts as a symptomless carrier and that a wild blackberry harbours the virus.

Bacteria.

1003. LARSH, H. W., AND ANDERSON, H. W.

Bacterial spot of stone fruit, with special reference to epiphytotes and dissemination of the causal organism.

Bull. Ill. agric. Exp. Stat. 530, 1948, pp. 55.

A study of the life history of *Xanthomonas pruni* under Illinois conditions. Primary foliage infection starts from spring cankers or terminal diebacks. The organism is disseminated by wind, rain and dew. Young trees may become diseased in the nursery, particularly when the nurseryman uses budwood from infected orchards. Chemical analyses suggest that reducing sugars in the bark have more influence than non-reducing sugars and nitrogen on the development of spring cankers.

1004. NONNECKE, I.

Fire-blight resistance across the prairies in *Malus*. (Part of report of fruit committee.) (Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 31-2.

Seventy-eight named apple varieties growing in different areas are classified as: resistant to very resistant, questionable (believed resistant), susceptible, and very susceptible. The possibility of the existence of physiological races of fire blight which differ in pathogenicity is mentioned. The value of Manchurian Crab seedlings as excellent ornamentals with marked resistance to fire blight is brought to notice.

1005. THORNBERRY, H. H., EISENSTARK, A., AND ANDERSON, H. W.

Studies on the bacteriophage of *Xanthomonas pruni*.

Phytopathology, 1948, 38: 907-11, bibl. 12, illus.

A bacteriophage, specific for *Xanthomonas pruni*, remained viable for 20 years in sealed tubes at room temperature in darkness.—Illinois Agric. Exp. Stat.

1006. BRAUN, A. C., AND MANDLE, R. J.

Studies on the inactivation of the tumour-inducing principle in crown gall.

Growth, 1948, 12: 255-69, bibl. 3, illus.

The experiments described were carried out on *Kalanchoe daigremontiana*. Results showed that inactivation of the tumour-inducing principle occurs at 32° C. The possible nature of the inactivation is discussed.

1007. DAINES, R. H.

Three years' tests with various compounds for control of bacterial spot of peach.
Abstr. in *Phytopathology*, 1949, 39: 5-6.

Of more than 20 compounds tested 5 gave some, others little or no protection, while trees sprayed with several of them had more disease than the controls.

1008. HANSEN, H. N.

A canker disease of figs.

Abstr. in *Phytopathology*, 1948, 38: 914-15.

A canker disease of White Adriatic fig trees in California is similar to a fig disease in Italy known to be caused by *Bacterium fici*.

Fungi.

(See also 787, 788, 839, 934, 1662.)

1009. MORWOOD, R. B.

Diseases of pome fruit in the Stanthorpe district [Queensland].

Qd agric. J., 1949, 68: 17-22, illus.

Notes are given on: powdery mildew, black spot or scab (*Venturia inaequalis*), armillaria root rot, canker (*Physalospora obtusa* is the most common, Gravenstein Gnarl is another type), wood rot (*Polystictus versicolor* and *Schizophyllum commune*), fruit rots (*Penicillium expansum*, *Glomerella cingulata* and *Sclerotinia fructicola*), dieback, deficiency diseases, sour sap, and scald (*Fabrea maculata*).

1010. WADE, G. C.

Apricot diseases.

Tasm. J. Agric., 1949, 20: 22-9, bibl. 1, illus.

Notes on symptoms and control are given for brown rot (*Sclerotinia fructicola*), shot hole and scab (*Coryneum beijerinckii*), dieback or gummosis, *Polystictus* dieback, black heart disease (*Verticillium dahliae*), silver leaf disease (*Stereum purpureum*), bacterial canker (*Pseudomonas cerasi* var. *prunicola*), mosaic disease, waterlogging injury, salt injury, and mineral deficiency.

1011. COLHOUN, J.

Nitrogen content in relation to fungal growth in apples.

Ann. appl. Biol., 1948, 35: 638-47, bibl. 13.

A study of the effects of change in the concentrations of nitrogen, malic acid and sugar in a standard nutrient medium on the rate of spread of *Cytosporina ludibunda* Sacc. and *Fusarium fructigenum*.—The Queen's University, Belfast.

1012. BLUMER, S., AND BIERI, F.

Schorfbekämpfungsversuche 1948. (Scab control trials in 1948.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 16-23.

In the course of their routine tests of new fungicides and insecticides the Wädenswil research station carried out extensive trials on scab control on more general lines. Although after two dry years there were relatively few perithecia on the ground in the spring of 1948, scab incidence was severe in some areas. From this observation it must be concluded that weather conditions are of greater significance in the rapid build-up of the disease than the number of primary infections by ascospores. The experiments, which are discussed in some detail, further show that in conditions favourable to infection nothing less than the

best chemicals will achieve a satisfactory degree of control and that correct timing of sprays is all-important.

1013. COLE, J. R.

Zinc dimethylthiocarbamate (Zerlate or Karbam White). A promising fungicide for pecan scab control.

Phytopathology, 1948, 38: 921-2.

In trials in which Zerlate was compared with bordeaux mixture for pecan scab control, both were effective; the trees sprayed with bordeaux mixture produced the greatest number of pounds of nuts, but the Zerlate-sprayed trees produced the heaviest individual nuts and the highest percentage of kernel in the nuts. All treated trees gave much higher yields of nuts and higher percentages of kernels than untreated trees.—Pecan Field Laboratory, Albany, Georgia.

1014. BLUMER, S., AND LÜTHI, E.

Der Apfelmehltau und seine Bekämpfung. (Apple mildew and its control.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 23-5.

Incidence of apple mildew has been widespread in eastern and northern Switzerland in recent years. Of 183 apple varieties grown at Wädenswil only 41 were free from the disease. E.M. rootstocks, too, were attacked, with the exception of E.M. XII and XV. Spraying trials with wettable sulphurs, to which a wetting agent was added in pre-blossom applications and in the first post-blossom sprays, showed that chemical treatment gives only incomplete control and that it must be supplemented by pruning. In summer affected growth is easily recognizable and in winter diseased shoots may be identified by bark symptoms.

1015. LOUW, A. J.

A leafspot disease of pears [in S. Africa].

Fmg S. Afr., 1948, 23: 737-41, 743, bibl. 3, illus.

This disease, caused by the fungus *Septoria piricola*, may cause serious damage to foliage and fruit in some seasons. Beurré Bosc is the most susceptible variety; Doyenné du Comice, Packham's Triumph and Winter Nelis are highly resistant. Primary infections each season originate from the ascospore stage of the causal fungus, *Mycosphaerella sentina*. The disease can be effectively controlled by spraying, copper sprays giving the best control, followed by lime-sulphur and wettable sulphur. Zinc-lime and oil sprays are also effective.

1016. YARWOOD, C. E.

Apricot jacket rot.

Abstr. in *Phytopathology*, 1948, 38: 919.

This disease, also called green rot, calyx rot, and blossom rot, is caused by *Sclerotinia sclerotiorum*, *Botrytis cinerea*, *Monilinia laxa* and *M. fructicola*, which are probably of importance in that order. Infection starting in the calyx causes the young fruit to rot and then drop. Jacket rot, and the twig phase of brown rot have been controlled by 0.2% Fermate plus spreader at full bloom.

1017. CALAVAN, E. C., AND KEITT, G. W.

Blossom and spur blight (*Sclerotinia laxa*) of sour cherry.

Phytopathology, 1948, 38: 857-82, bibl. 45, illus.

Cultural, pathological, and control studies were made of *Sclerotinia laxa* in relation to its causing blossom and spur blight of acid cherries in Wisconsin. Infection of a flower may take place through the petals, stigma, style or stamens. The critical period for infection is during blossoming, but under experimental conditions unopened, white-tipped buds were frequently infected. Infection of green fruits and leaves sometimes occurred under specially favourable conditions in the greenhouse and in the orchard. In the epidemic season of 1943 the eradicant spray of copper-lime-monocalcium arsenite plus cold-pressed menhaden fish oil, 3-2-2 (1½ pints fish oil)-50, applied just before budbreak, gave satisfactory suppression of sporodochia and 97% reduction in incidence of spur blight.—University of Wisconsin.

1018. MORGAN, O. D., AND POWELL, D.

The effect of wetting agents on brown rot control.

Abstr. in *Phytopathology*, 1949, 39: 16.

In trials on peach trees Triton B 1956 was the most effective wetting agent with copper 8-quinolinolate and allowed 12% brown rot; copper 8-quinolinolate used alone resulted in 28% infection while control trees showed 38% infection.

1019. PLAKIDAS, A. G.

Strains of *Mycosphaerella fragariae*.

Phytopathology, 1948, 38: 988-92.

The results of inoculation experiments indicate that *Mycosphaerella fragariae* is composed of strains that vary in their pathogenicity toward different varieties of the cultivated strawberry.—Louisiana Agricultural Experiment Station.

1020. GAUDINEAU, M.

L'odium ou blanc du pommier. (Apple mildew.)

Fruit belge, 1949, 17: 1-5.

This is mostly a review of work by others. A spraying trial with lime-sulphur, briefly described, gave inconclusive results.

1021. GALLAY, R., AND STAHELIN, M.

La lutte contre le mildiou de la vigne vue à la lumière des expériences de l'année 1948. (The control of vine mildew in the light of the 1948 experiments.)

Rev. romande Agric. Vitic., 1949, 5: 11-15.

Results obtained at Lausanne in 1948 confirmed those obtained earlier by the same workers [see *H.A.*, 18: 247]: While pre-blossom sprays of cuprous oxide in normal circumstances combine adequate protection against mildew with comparative safety, no satisfactory substitute for bordeaux mixture exists, which can be recommended for post-blossom applications. Only best quality lime should be used in making up the spray preparation.

1022. SWARTENBROEKX, J.

De wortelziekte en het afsterven der druivelaars (*Rosellinia necatrix* (Hart.) Berl.).

(White root rot of vines.)

Cult. Hand., 1948, 14: 774.

The control of white root rot of vines by a solution of an organic mercury preparation (Aretan 5 g. per litre) applied to affected roots and to the soil.

1023. Poulos, P. L., and Heuberger, J. W.
Peach brown rot: pre-harvest sprays and control in the orchard and in the package.
 Abstr. in *Phytopathology*, 1949, 39: 18.
 The best control was obtained with Bioquin 1+B-1956 (4-1 oz.-100). A combination of liquid lime-sulphur + Sulforon (a wettable sulphur) 1 qt.-2-100 appeared promising.

1024. Williams, W. O., and Hewitt, W. B.
Control of grape root-rot (*Thielavia basicola*) in solution culture.
Proc. Amer. Soc. hort. Sci., 1948, 52: 279-82, bibl. 3.

The addition of five parts per million of Fermate weekly to Thompson Seedless *vinifera* vines growing in culture solution resulted in successful growth.

1025. Baker, R. E., and Voth, V.
Sample size and plot size for testing resistance of strawberry varieties to *Verticillium* wilt.
Phytopathology, 1948, 38: 1034-6.

The authors find that, by designing field trials in the "wilt nursery" to include a minimum of 3 plots of 50 plants or 8 plots of 25 plants for all selections and varieties of strawberry, it will be possible to determine relatively small differences in resistance among selections and varieties.—California Agricultural Experiment Station, Davis.

Mites and insects.

1026. Michelbacher, A. E., and Essig, E. O.
Ridding the garden of common pests.
Circ. Calif. agric. Ext. Serv. 146, 1948, pp. 39, illus.

A popular account of the pests likely to be found in Californian gardens, with notes on the preparations used in controlling them, and their application. Reference is also made to diseases of garden plants, with minimum disease-control programmes for vegetables and for flowering plants.

1027. Clancy, D. W., and Pollard, H. N.
Effect of DDT on several apple pests and their natural enemies.
J. econ. Ent., 1948, 41: 507-8, bibl. 4.

It is suggested that outbreaks of insect pests following the use of DDT may not be entirely due to the destruction of their natural enemies. Preliminary results of a field study in Virginia indicate that the ineffectiveness of the predators of the mites *Paratetranychus pilosus* and *Tetranychus* spp. was due as much to their initial scarcity and irregular distribution as to the use of DDT, and the lower population of red-banded leaf roller on trees sprayed with lead arsenate was shown to be due to the fact that this is more toxic to the larvae than DDT. Although DDT eliminated the parasites of Comstock mealybug, no increase of the pest was observed in treated orchards.

1028. Hough, W. S.
Control of mites on apple trees sprayed with DDT.
J. econ. Ent., 1948, 41: 207-9, bibl. 2.

DDT sprays tend to increase the red spider population on fruit trees. The effect of various acaricides added

to the codling moth DDT sprays was tested at the Virginia agric. Exp. Stat., Winchester. Di(4-chlorophenoxy)methane consistently proved most effective in red spider control. Parathion gave good control, and also increased the insecticidal value of the DDT spray; it would moreover give control of codling moth larvae for several days when used alone, but was not very persistent. Diocetyl phthalate and N-dodecyl-2-thiazolinyl sulphide gave promising results.

1029. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.
Red mite (*Bryobia praetiosa*).
Agric. Gaz. N.S.W., 1948, 59: 649-51.

The red mite, a common pest of pome and stone fruit in New South Wales, can be controlled by winter treatment—spraying with a dormant or semi-dormant oil (1 gal. oil to 20 gal. water) or with lime-sulphur at winter strength—and by spring and summer treatment with lime-sulphur, diluted according to the stage of growth the trees have reached. The white oil sprays used for the control of codling moth on apples will give good control of red mite.

1030. Jones, S. C., and Rosenstiel, R. G.
Parathion for control of the 2-spotted mite and certain insects.
J. econ. Ent., 1948, 41: 118.

Parathion was tested, under field conditions, for the control of the mite, *Tetranychus bimaculatus*, pear thrips, *Taeniothrips inconsequens*, and black peach aphid, *Anuraphis persicae-niger*. 0.25% dust was effective against mite 2 days after dusting, but had lost its effect 16 days later. In laboratory tests against cherry fruit fly, *Rhagoletis cingulata*, 100% kill was obtained in 36-68 hours after treatment with 0.25% dust.

1031. Ross, W. A., and Armstrong, T.
Notes on some of the newer acaricides.
Sci. Agric., 1949, 29: 81-5.

Brief notes on the effectiveness and limitations of some newer acaricides for control of European red mite and two-spotted spider mite, based on greenhouse and orchard experiments at the Vineland Station, Ontario. Di-para-chlorophenylmethylcarbinol (DMC) was one of the best of the specific acaricides. Di-(para-chlorophenoxy)methane (DCPM), parathion, and the mono-ethanolamine salt of dinitro-o-cyclo-hexylphenol (DNOCHIP) also gave good results. Results indicate that summer oil emulsion remains one of the best acaricides, but it is incompatible with sulphur and DDT.

1032. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.
Green peach aphid (*Myzus persicae*).
Agric. Gaz. N.S.W., 1948, 59: 601-3, illus.

The green peach aphid is sometimes a serious pest in the main peach- and nectarine-growing districts of New South Wales. The trees are injured in spring and early summer and severe infestations cause distortion of leaves and blossoms, which later die. Control is effected by ovicidal dormant sprays (tar distillate or DNC-oil), and contact sprays (nicotine, DDT, or HETP) timed to kill the young aphids. The main plants known to serve as secondary hosts for this aphid in

New South Wales are artichoke, Cape weed, dock, dahlia, Iceland poppy, pea, potato, rose, spinach, sowthistle, tomato, trumpet flower, cabbage, cauliflower and radish.

1033. CHAPMAN, P. J., AND AVENS, A. W.

The toxicity of 4,6-dinitro-o-cresol as an aphid ovicide.

J. econ. Ent., 1948, 41: 190-8, bibl. 15, illus.

The concentration of DNOC required to kill *aphis* eggs varies considerably with the species. Studies made under controlled conditions at the Geneva Station, N.Y., show that the minimum effective concentration ranges from 0.003% to 0.05%, but this must be increased for orchard conditions. Eggs that hatch early in the season are most susceptible, but the time of spraying appears to have no effect on efficiency. Aqueous solutions of the acid and of its sodium, calcium, ammonium and magnesium salts are equally effective with the same dinitro-o-cresol content.

1034. BOWEN, C. V., AND WEIGEL, C. A.

Comparative toxicity of nicotine, nornicotine and anabasine to green peach aphid.

J. econ. Ent., 1948, 41: 117, bibl. 8.

Results of tests using 0.025% aqueous solutions of each insecticide indicate that anabasine and nornicotine are considerably more toxic to *Myzus persicae* at this concentration than nicotine. At concentrations of 0.05% and 0.2%, however, there was no difference in toxicity.

1035. FAGEL, G.

Notes sur le comportement hivernal de *Myzus persicae* Sulzer. (On the winter habits of *Myzus persicae*.)

Parasitica, 1948, 4: 171-3, bibl. 9.

An account of observations on *Myzus persicae* in relation to its host plants in the mild winter of 1947-48, with particular reference to its occurrence on peach, and brussels sprouts, and in clamps of beetroot and potatoes. The observations confirm that the aphid can hibernate on brassicae and reproduce parthenogenically during a mild winter. Based on these observations, recommendations for its control are formulated for those regions where seed potatoes are grown.—Gembloux.

1036. DETROUX, L.

Essais sur la valeur comparée de quelques produits ovicides utilisés pour la destruction des œufs du puceron du pommier (*Aphis pomi*). (Testing certain ovicidal products for killing eggs of the green apple aphid.) [Summary in Dutch.]

Parasitica, 1948, 4: 175-85, bibl. 5.

In the experiments described the ammonium salts of DNOC and DNOP were more toxic to the eggs of *Aphis pomi* than the sodium salts. Lowering the surface tension had a synergistic action on toxicity. Lowering the temperature retarded the action of products used in winter spraying of fruit trees.—Gembloux.

1037. WHEELER, E. H., AND OBERLE, G. D.

Oils in dormant sprays to control European fruit lecanium and cottony peach scale.

J. econ. Ent., 1948, 41: 186-9, bibl. 7.

The efficiency of various types of petroleum oils in the

control of lecanium on quince and cottony scale on peach trees is compared, in trials carried out at Geneva, N.Y. Paraffin oils are more effective than the naphthenic type, and only 2% and 3% oil concentration is needed to give commercial control of lecanium and scale respectively. The addition of a dinitro compound greatly increases the insecticidal properties of the oil, but causes considerable damage to the trees, whereas emulsification with bordeaux mixture reduces control efficiency but does no damage.

1038. AUBANEL, G.

Remarques sur la biologie de la cochenille ronde du poirier (*Diaspis leperii* Sign.) au cours de l'année 1947. (The biology of the pear scale insect, *Diaspis leperii*, during 1947.)

Prog. agric. vitic., 1948, 130: 309-11.

Observations confirm that *Diaspis leperii* has only one generation in France annually. Egg-laying at Versailles starts about 17 May, at Lyons six days later. It hibernates as an immature fertilized adult female. Its ravages are checked by an acarid predator and a hymenopterous parasite.

1039. MAGISTRETTI, G.

La lucha contra los coccidos parasitos de los olivares mendocinos. (The fight against scale insects in the olive groves of Mendoza.) [English summary.]

Experimenta, Mendoza, 1948, 1: 38-47, bibl. 10, illus.

In an intensive olive-growing district like Mendoza, the economic importance of scale insects is very great. Descriptions and illustrations are given by which the five most commonly found scale insects may be recognized, together with reliable control measures.

1040. CHANDLER, S. C.

Control of peach cat-facing in Illinois.

J. econ. Ent., 1948, 41: 52-5, bibl. 2.

DDT, applied as a spray or a 5% oil dust during blossoming, and again when the shucks were cracking, reduced cat-facing considerably, but the results were very variable. Benzene hexachloride and chlordan gave no control when applications were started at the shuck split stage.

1041. HAMILTON, D. W.

Summer control of pear psylla during 1947.

J. econ. Ent., 1948, 41: 244-8, bibl. 1.

The author reports on tests made with several insecticides for the control of *Psylla pyricola*. Nicotine sulphate killed a high proportion of nymphs, but had no residual effect, so the population built up again rapidly. High temperatures and the addition of oil or lime increased the kill. Similar results were given by HETP, TEPP, piperonyl cyclonene with pyrethrins, and piperonyl butoxide with pyrethrins, but these tended to damage leaves and fruit. Parathion, chlorinated camphene, and cubé root gave good immediate control, and also had a certain residual effect; they caused no damage. Chlordan proved ineffective.

1042. HAMILTON, D. W.

Pear psylla control with dormant sprays.

J. econ. Ent., 1948, 41: 443-5, bibl. 4.

Field trials made near Poughkeepsie, N.Y., show that

commercial control of pear psylla (*Psylla pyricola*) can be obtained throughout the season by a carefully timed dormant application of oil emulsion, dinitro compound, or a combination of the two.—Bureau of Entomology and Plant Quarantine.

1043. SCHENK, P. J.

Blaaspoten of thrips. (Thrips.)
Cult. Hand., 1948, 14: 624-6, illus.

Two species of thrips, *Heliothrips haemorrhoidalis* and *Kakothrips robustus*, and the damage they cause (particularly in greenhouses) are described and illustrated. Under glass, control should be directed to maintaining a moist, cool atmosphere. Fumigation, spraying or dusting can be employed when thrips are already present, using preparations containing nicotine, pyrethrum, derris, DDT, 666, sodium or calcium cyanide, or naphthalene.

1044. STAHEL, M., AND HOLENSTEIN, R.

Der Buchenbock, ein Kirschbaumschädling.
Cerambyx scopolii, a cherry pest.)
Schweiz. Z. Obst- u. Wein., 1948, 57: 413-16.

Reports have come in from several parts of Switzerland that much damage to cherries has been caused by the longhorn beetle, *Cerambyx scopolii*. The life history of the pest is described and well illustrated. In the case of an infestation of the stem the fruit drops prematurely and the whole tree dies back. Where branches are attacked, only that particular part of the top is affected. Early stages show gumming and cracks and swellings in the bark as symptoms. The damage is caused by the feeding of the 3.5-4.5 cm.-long larvae in the wood. The method of control most likely to yield results is the introduction of cotton wool soaked in carbon disulphide into the galleries and the subsequent sealing off of the holes. Prevention, however, is more satisfactory. Observations have shown that oviposition occurs in wounds, frost cracks, etc. Special attention should, therefore, be paid to the immediate treatment of all injuries.

1045. SMITH, C. F.

Plum curculio control in North Carolina.
J. econ. Ent., 1948, 41: 220-7, bibl. 5, illus.

The traditional burning of debris round the edge of peach orchards and adjoining woods is justified, as the majority of plum curculios hibernate there. This practice, however, does not allow modification of the spray programme. Trials by the North Carolina Station at Raleigh show that benzene hexachloride gives very effective control of curculio, if both the tree and the soil below it are drenched. No taint remains with the fruit when eaten fresh, but canned peaches, sprayed a week before harvest, were slightly tainted. Chlorinated camphene gave good results, but it causes damage to the tree unless combined with wettable sulphur. Cryolite, lead arsenate, and hexaethyl tetraphosphate are all phytotoxic.

1046. STEARNS, L. A., AND WARREN, J. C.

Control of plum curculio with benzene hexachloride.
J. econ. Ent., 1948, 41: 227-30.

Confirmation is given of the effective control of curculio on peach trees by benzene hexachloride, and of unsatisfactory control by basic lead arsenate and acid lead

arsenate. A delayed harvest, however, resulted in much brown rot infection and oriental fruit fly attack, which were less efficiently controlled by benzene hexachloride than by the other two treatments.

1047. GRAYSON, J. M.

Benzene hexachloride and DDT to control plum curculio.
J. econ. Ent., 1948, 41: 231-4, bibl. 5.

Results are given of field and laboratory experiments designed to determine the concentration of benzene hexachloride, and number of applications needed to control curculio on peach trees. Four applications at 0.2 lb. γ isomer per 100 gal. gave the best field results. Soil treatment at the rate of 1 lb. per acre gave 60.9% control, but DDT dust at 10 and 25 lb. per acre was ineffective.

1048. DEWEY, J. E., AND VAN GELUWE, J. D.

Some organic insecticides for control of plum curculio on peaches.
J. econ. Ent., 1948, 41: 235-9, bibl. 2.

The comparative values of benzene hexachloride, parathion, chlordan, chlorinated camphene, and lead arsenate, as a control for curculio, were investigated. Benzene hexachloride and parathion were found superior to the traditional lead arsenate spray, both by reducing the loss of fruit as drops, and by reducing the total injury to the fruit crop. These two insecticides appear to be toxic to newly hatched larvae and eggs as well as to adults.

1049. NEISWANDER, R. B.

Plum curculio on peaches and plums in Ohio.
J. econ. Ent., 1948, 41: 450-3, bibl. 5.

Acid lead arsenate, the standard spray for control of plum curculio (*Conotrachelus nenuphar*), is liable to cause serious foliage injury on peach trees. Trials made at the Ohio Agricultural Experiment Station have shown that benzene hexachloride, used in 5 applications at 10-day intervals beginning at petal fall, makes a satisfactory substitute. It does not damage the foliage or taint the fruit.

1050. ANON.

Die Bekämpfung der Maikäfer und Engerlinge. (The control of cockchafers and their larvae.)

Mitt. Eidg. landw. Versuchsanst. Obst- Wein- und Gartenb. Zürich-Oerlikon, 1948 (?), pp. 4 [received 1949].

Discusses control measures under 1, the adult insects; 2, preventing oviposition; 3, larvae; 4, alleviating the loss in attacked crops.

1051. SCHNEIDER, F., AND BACHMANN, F.

Bekämpfungsversuche gegen Maikäfer im Frühjahr 1948 an der Eidg. Versuchsanstalt für Obst-, Wein- und Gartenbau in Wädenswil. (Trials for the control of cockchafers at Wädenswil in spring 1948.)

Schweiz. Z. Obst- u. Weinb., 1949, 58: 37-40.

In trees infested with cockchafers, parathion and hexa preparations, applied as sprays or dusts, had a quicker knock-out action than DDT from which the beetles may recover. On the other hand, DDT residue provides protection for a longer period. A combination of DDT and parathion is tentatively suggested.

1052. GAMBRELL, F. L., AND MASON, A. C.

Insecticidal and phytotoxic properties of plant dips used to control the European chafer.

J. econ. Ent., 1948, 41: 258-63, bibl. 7, illus.

A safe and efficient treatment for balled and burlapped nursery stock, to prevent spread of *Amphimallon majalis*, is needed. In this investigation the relative effectiveness of ethylene dichloride, ethylene dibromide, and combinations of the two, is observed, both as a plant dip and as a surface application to seedbeds. Their phytotoxicity to certain species of evergreens is also tested. Ethylene dichloride, at 20 ml. per gal., was found to kill third-instar larvae and did no damage to the plants when used as a dip. Ethylene dibromide, at 1-2.5 ml. per gal., gave good control, but cannot be recommended without further trial.

1053. HOLENSTEIN, R.

Engerlingsbekämpfung in Reben. (Cock-chafer grub control in vines.)

Schweiz. Z. Obst- u. Weinb., 1948, 57: 439-42.

A very heavy white grub infestation of Swiss vineyards is anticipated for 1949. The hexa-preparation Hexaterr should be applied to the soil before the end of April or the beginning of May, at the rate of 1 kg. per 100 m². Where damage in young vineyards is already apparent an injection into the root zone of a Hexalo solution is preferable, at a concentration of 1.5 kg. in 400 litres of water and at a rate of 400 litres per 100 m².

1054. MUNDINGER, F. G.

Experiments on control of the Eastern raspberry fruit-worm.

J. econ. Ent., 1948, 41: 436-40, illus.

The maintenance of a protective cover on raspberry plants for at least 2 weeks before the blossoms open is essential in the control of fruit worm (*Byturus ombi*). DDT used as a dust or spray was found to give the highest reduction in infested fruit of all the control materials tried. Two applications are advised, the first just after the blossom buds appear, and the second a few days before they open.—New York State Agric. Exp. Stat., Geneva.

1055. ROSELLA, E.

Le *Capnodis* menace les vergers d'arbres fruitiers à noyaux en Afr. du Nord. (*Capnodis tenebrionis*) threatens stone fruit orchards in North Africa.)

Prog. agric. vitic., 1948, 130: 283-6.

The *Capnodis* bark beetle is considered as the main enemy of stone fruit orchards both in southern France, and particularly in North Africa. Control measures involve keeping the trees in vigorous growth, irrigation, selection of suitable rootstocks, planting healthy trees and the possible use of dibromethane for soil injection. The application of sprays containing HCH may prove expensive, for it must be carried out several times during the season.

1056. ROSELLA, E.

Pour augmenter la résistance au capnode: Il faut soigner les arbres et choisir un bon porte-greffe. (To increase resistance to the wood boring beetle a good rootstock must be chosen.)

Prog. agric. vitic., 1948, 130: 262-4.

The author maintains that the use of unsuitable rootstocks reduces the resistance of fruit trees to the wood-boring beetle *Capnodis tenebrionis* and discusses the facts that (1) plum is a bad rootstock for apricot, (2) under irrigation the almond is to be avoided as a rootstock for peach, (3) under irrigation the St. Lucia cherry is an unsuitable rootstock for cherry.

1057. LANE, M. C., AND OTHERS.

Studies with DDT as a control for wireworms in irrigated lands—Progress report.

(Mim. Publ.) *U.S. Dep. Agric. Bur. Ent. Pl. Quar. E-765*, 1948, pp. 9, bibl. 7.

Dosages of 10 to 20 lb. of DDT per acre remain toxic to wireworms the second season after application. Excessive dosages in the soil have injured plants.

1058. SCHENK, P. J.

Pissebedden of muurvarkens. (Woodlice.) *Cult. Hand.*, 1948, 14: 789-90, illus.

An account of woodlice, their habits, the damage they cause, and their control by baits and by fumigation with hydrocyanic gas.

1059. HODSON, A. C.

Further studies of lures attractive to apple maggot.

J. econ. Ent., 1948, 41: 61-6, bibl. 5, illus.

Traps for the apple maggot, *Rhagoletis pomonella*, find a practical use in estimations of population size and the correct time to spray. A mixed solution of 2% urea and 3% sodium hydroxide remained an attractive bait for several weeks. Dry traps, containing ammonium carbonate as bait, were found slightly less efficient, but much simpler to use.

1060. ALLMAN, S. L., AND FRIEND, A. H.

New insecticides and fruit fly control.

Agric. Gaz. N.S.W., 1948, 59: 531-3.

Tartar emetic-sugar foliage poison baits applied twice weekly, and 0.2% DDT sprays at fortnightly intervals have both appreciably controlled the Queensland fruit fly (*Strumeta tryoni*) on Narrabeen plums. It is impossible to say which is the more effective but the bait method has advantage over cover spraying when costs, equipment and labour are taken into account.

1061. SILVA, G. DE M.

Acção da temperatura sobre a ninhose do *Dacus oleae* Grmel. I. Temperaturas constantes e baixas temperaturas. (The action of temperature on the nymphosis of *Dacus oleae*. I. Constant and low temperatures.) [English summary ½ p.]

Agron. lusit., 1945, 7: 355-62, bibl. 5, [received 1949].

The optimum developmental temperature for the olive fly is about 25°C. At this temperature the length of the pupal stage is 12-13 days, at 20°C. it is 18 days, and at 15°C. 28 days.

1062. STEARNS, L. A., WARREN, J. C., AND PARKER, W. LEROY.

Chlorinated camphene for control of eastern tent caterpillar, boxwood leafminer and bagworm.

J. econ. Ent., 1948, 41: 264-7, bibl. 5.

Compared with the various recommended controls for

these three tree pests, chlorinated camphene combines the great advantages of low cost, rapid action, and complete control of all three. Moreover, it does no damage to any of the plant species tested, except Imperial Gage plum and sugar maple.

1063. SMIT, B.

Cutworms in farm lands and gardens [in S. Africa].

Fmg S. Afr., 1948, 23: 756-8.

The various species of cutworm [lepidopterous larvae] are among the worst and most persistent insect pests in S. Africa. Their life-cycle and feeding habits are described and the following control measures set out: (1) winter ploughing, (2) starvation, i.e. keeping weeds down in spring by ploughing and cultivation, and (3) poison bait, e.g. chopped greenstuff moistened with a solution made from 1 lb. sodium arsenate or Paris green, or $1\frac{1}{2}$ lb. calcium or lead arsenate, in 8 gal. water, plus 8 lb. sugar or 1 gal. molasses. Alternatively a convenient dry bran bait can be made using the same quantity of arsenate to which is added 4 lb. sugar, or $\frac{1}{2}$ gal. molasses, and 20 lb. bran. The best results from baiting are obtained on fallow.

1064. MAY, A. W. S.

Codling moth control experiments, 1947-48 [in Queensland].

Qd agric. J., 1948, 67: 143-6.

An account of experimental procedure is followed by a discussion of the results as they concern codling moth, woolly aphid and mites (*Bryobia praetiosa*). It is concluded that further experimental work is necessary before the many problems that have arisen following the use of DDT can be solved, e.g. the control of woolly aphid, and the reduction in number of DDT applications required to control codling moth. Further experimental work was planned for 1948-49.

1065. STEPHENS, R. M.

Codling moth control. DDT trials in the Goulburn Valley, Victoria.

Fruit World, Melbourne, 1948, 49: 9: 11.

In the experimental work described it has been shown that efficient control of codling moth has been obtained with a schedule of three sprays of DDT at a concentration of 0.1% DDT. This programme is significantly superior to either two sprays of 0.1% or three sprays of 0.05% under the same conditions. It has also been demonstrated that the optimum time for the application of the first spray was in the eight days following the first major peak of emergence. [Author's summary.]

1066. THERON, P. P. A.

Studies on the provision of hosts for the mass-rearing of codling moth parasites.

Sci. Bull. S. Afr. Dep. Agric. 262, being *Fruit Res. (Tech. Ser. 4)*, 1947, pp. 38, bibl. 65, illus.

The problem of providing host material for codling moth pupal parasites is discussed, the provision of codling moth larvae themselves presenting many difficulties which are here set out. A substitute has been found in the false codling moth (*Argyrolopoche leucotreta* Meyr.) which can readily be reared on artificial foods by the Ripley technique (*Sci. Bull. S. Afr. Dep. Agric.* 207). The present author gives

an account of his own technique in mass-rearing the false codling moth on maize meal.

1067. O'LOUGHLIN, G. T.

Codling moth control. DDT trials in southern Victoria.

J. Dep. Agric. Vict., 1948, 46: 442-4, and *Fruit World, Melbourne*, 1948, 49: 11: 5.

In orchards where DDT has been previously used, three half-strength sprays (0.05%) will give good control of codling moth. The number of light brown apple moth (*Tortrix postvittana* Walk.) increased as DDT applications were reduced. The inclusion of two lead arsenate sprays early in the season will give effective control of the latter.

1068. GENTNER, L. G., MORRISON, H. E., AND RASMUSSEN, W. B.

Aerosol generator applications of DDT for codling moth control.

J. econ. Ent., 1948, 41: 67-9.

The effectiveness of DDT applied in oil solution by means of an aerosol generator was compared with normal cryolite sprays, for control of codling moth on Bartlett pears in Oregon. The insecticidal material was atomized by means of superheated steam. Although the fog was applied from one side of the row only, with the result that the DDT residue was very uneven, control of codling moth compared very favourably with that given by cryolite sprays, but it was not found possible to combine an acaricide for the control of red spider with the DDT aerosol.

1069. BORDEN, A. D.

Control of codling moth on pears with a DDT spray.

J. econ. Ent., 1948, 41: 118-19.

From the results of a trial at the University of California the author concludes that labour and the cost of spraying material can be considerably reduced, if sprays are applied in concentrated form by means of equipment such as the Speed Sprayer. When the number of jets was reduced to 45, and the openings to .05 inch to produce a very fine mist, even deposit and excellent control of codling was obtained by a DDT emulsion. No injury to foliage occurred.

1070. DOUET, R. L.

Effect of codling moth sprays on natural control of the Baker mealybug.

J. econ. Ent., 1948, 41: 116-17.

Data obtained by the University of California show that severe infestations of the Baker mealybug (*Pseudococcus* sp.) on pears are correlated with the application of DDT, for this is highly toxic over a long period to *Chrysopa californica*, the natural predator. If the number of DDT sprays for codling control were reduced, and the predators of the mealybug supplemented from artificially raised colonies, control of both pests might be obtained.

1071. VAN LEEUWEN, E. R.

Attractiveness of pine-tar oil in baits for codling moth control.

J. econ. Ent., 1948, 41: 345-51, bibl. 2.

Experiments in orchards near Yakima, Washington, showed that pine-tar oil placed in separate containers near the standard bait of molasses, yeast and water,

increased the attractiveness of the bait to codling moth by 171%. Several combination baits were tested, and one containing valeric acid and nicotine sulphate, in addition to the standard bait and pine-tar oil, proved most effective. The baits used, however, have little practical value as a control measure, for not only is the labour of maintenance considerable, but they attract moths from unbaited orchards and so tend to counteract their effectiveness.—Bureau of Entomology and Plant Quarantine.

1072. ANON.

De perzik scheutboorder. (The peach shoot borer [*Anarsia lineatella* Zell.].)
Vlugschr. Plziekt. Dienst, 1948, 61, pp. 4, illus.

This pamphlet was written for the benefit of growers after the serious plague of peach shoot borer caterpillars that spread through West Holland in 1948. The pest had previously been unknown in Holland, and although only glasshouse trees were attacked, growers are warned to protect their nursery stock as well. The life history of the insect, and reliable control measures, are given.

1073. MAY, A. W. S.

The light brown apple moth [in Queensland].
Qd agric. J., 1948, 67: 212.

An unusually severe late outbreak of this pest [*Tortrix postvitana*] occurred in 1947-48 on apples and grapes. The phenomenon was probably seasonal. The habits of the moth, and its control, are described.

1074. COUTURIER, A.

Les noctuelles de la vigne en Alsace. (The night-flying moths of the vine in Alsace.)
Prog. agric. vitic., 1948, 130: 289-91, bibl. 4.

The larvae of night-flying moths, particularly *Agrotis pronuba*, *A. c-nigrum* and *A. comes*, caused severe damage in Alsatian vineyards, by destroying shoots as they emerged, in the springs of 1945 and 1946. Notes are given on their habits and on control by the use of DDT and sodium arsenite.

1075. LAPLANTE, A. A., Jr., AND WHEELER, E. H.

DDT and benzene hexachloride in sprays to control peach tree borer.
J. econ. Ent., 1948, 41: 240-4, bibl. 1.

The use of paradichlorobenzene and dichlorides for the control of peach tree borer has not only proved difficult and inadequate, but has often caused injury to the trees. Trials with DDT at Geneva, N.Y., show that this will give very effective control if sprayed at 1 lb./100 gal. directly onto trunk, crutches and limb bases. The general DDT spray for fruit moth is insufficient. Borers associated with wounds are not controlled by DDT; in this respect benzene hexachloride is superior. In healthy wood, borers are checked by one well-timed application of benzene hexachloride almost as well as by two applications of DDT.

1076. NICKELS, C. B.

Cameraria caryaefoliella, a pest on pecan.
J. econ. Ent., 1948, 41: 114, bibl. 1, illus.

Although the leaf miner, *Cameraria caryaefoliella*, is found in all pecan growing districts, it is generally a pest of minor importance. The author gives a brief

account of its life history, parasites, and the nature of its damage.

1077. HARDY, D. E.

Aristotelia fragariae on strawberries in Iowa.
J. econ. Ent., 1948, 41: 108.

The strawberry crown miner is reported to have been found in Iowa for the first time. Severe damage was caused, but one carefully-timed application of 5-10% DDT was found to give complete control.

1078. FRAZIER, N. W., AND BARNES, D. F.

Experiments for control of the grape leaf folder in California.
J. econ. Ent., 1948, 41: 441-2.

Several of the new organic insecticides were tested for the control of grape leaf folder (*Desmia funeralis*), but were found to compare unfavourably with the standard cryolite treatment.—California agric. Exp. Stat., Berkeley.

1079. HARMAN, S. W.

Red-banded leaf roller control in western New York in 1947.
J. econ. Ent., 1948, 41: 210-12.

There has been a sudden and serious outbreak of red-banded leaf roller (*Argyrotaenia velutinana* Wlkr.) in many apple growing areas in the United States during the last two years. It is suggested that this may be due to the recent use of DDT instead of lead arsenate for control of codling moth caterpillar. Advantage was taken of the outbreak, by the N.Y. Experiment Station at Geneva, to obtain information on the best means of control. It was found that lead arsenate (at 3 lb./100 gal.) is outstandingly more effective than DDT, which is of little value. Sprays should be applied in June, and directed against the first brood of caterpillar, as control of the second brood in August is difficult. The new insecticide, parathion, gives exceptionally good control of leaf roller. In all cases, the method of application is very important; the sprays must be directed to the lower leaf surface where the caterpillars feed.

1080. HARMAN, S. W.

The red-banded leaf roller as an apple pest in New York.
Bull. N.Y. St. agric. Exp. Stat. 733, 1948, pp. 23, illus. [received 1949].

The red-banded leaf roller, *Argyrotaenia velutinana* (Wlkr.) sometimes appears in epidemic strength and may cause damage exceeding that of codling moth. There are two broods per year in New York and it is against the first that control measures are most effective. The insect feeds almost entirely on the under side of leaves, and spraying must be such that the insecticide is deposited on the lower leaf surfaces. At present lead arsenate is the insecticide preferred against this pest, though some of the newer ones, such as parathion, are very promising.

1081. HOUTMAN, G.

Een nieuwe bladbeschadiging. (A new leaf pest.)
Fruiteelt, 1948, 38: 756-7.

Larvae of a small white moth, identified as a species of *Lithocolletis*, probably *concomitella* Bnks.=L.

pomisoliella Z., are reported as damaging apple leaves, particularly on Belle de Boskoop, in Holland. Some of the pupae were found to be parasitized by an ichneumon fly, not identified.

1082. GAIRAUD, R., AND JOLY, E.

Biologie de l'hoplocampe des poires (*Hoplo-campa brevis*). (Biology and control of pear sawfly.)

Rev. hort. Paris, 1949, 121: 22-5, illus.

A continuation of the work done by the Service de la Protection des Végétaux at Toulouse [see *H.A.*, 18: 1805]. In order to confirm the theory that the ovicidal properties of control sprays for pear sawfly were increased by better penetration of the skin of the fruit, various materials were used both in powdered form in terpenyl alcohol, and in emulsion form or with 1% white oil. As expected, the effectiveness of the material was increased in every case by emulsification or combination with oil. Trials were also carried out to determine the stage of sawfly development at which each insecticide was most effective. Materials that are both ovicidal (or toxic to newly hatched larvae) and larvicidal (Rotenone, DDT, 666, and SPC) should be applied 10 days after flowering starts and again after petal fall. This second spray may be omitted if a persistent material such as DDT emulsion is used. Materials that have a larvicidal action only (arsenicals) must be applied before the larva enters the eye of the apple, 10-12 days after flowering starts. In many cases, where flowering is prolonged, it is impossible to comply with the regulations against using certain sprays during blossom time and also obtain perfect control of sawfly.

1083. BORG, A.

Bekämpningsförsök mot plommonstekeln. (The control of plum sawfly.)

Växtskyddsnotiser, 1948, pp. 54-6.

Proprietary preparations containing (1) DDT and (2) a combination of pyrethrum and "666", were tested against plum sawfly. The latter was slightly superior to two DDT preparations. In normal years one spray application immediately after blossoming should give sufficient control. In cases of severe infestation or when a poor crop is anticipated, both pre- and post-blossom sprays are recommended.

1084. LLOYD, N. C.

The use of DDT to control the cherry slugworm (*Caliroa limacina*).

Agric. Gaz. N.S.W., 1948, 59: 541, 546, illus.

Satisfactory control of the cherry slugworm was obtained by spraying the foliage once with DDT emulsion at a concentration of 0.05%.

1085. GAYFORD, G. W.

The pear and cherry slug.

J. Dep. Agric. Vict., 1948, 46: 560-1.

The pear and cherry slugworm [*Caliroa limacina*] can be readily controlled by sprays of lead arsenate, 2 lb. powder per 100 gal. water, or 0.1% DDT. It is recommended that cherries and plums be sprayed as soon as live insects are noticed after the crop has been picked.

1086. GRAHAM, C.

Control of grasshoppers in apple and peach orchards.

J. econ. Ent., 1948, 41: 111.

Application of benzene hexachloride dust from the air was not effective in controlling grasshoppers, probably because it was not possible to obtain good coverage round the base and lower limbs of the trees by this method. Applied with a portable duster Benzene hexachloride, 6% gamma isomer, at a minimum rate of 4 oz. per acre, controlled young grasshoppers. Chlordan at 2 lb. per acre proved effective against the adults.

Vermin.

1087. TALBERT, T. J.

Rodent control in orchards.

Circ. Mo. agric. Exp. Stat. 321, 1948, pp. 11, illus.

The following protective methods are briefly dealt with: mechanical protection of trees with wrappers and wire netting, mounding of soil, etc., around trees, poisoning, fencing, use of repellents, shooting, trapping, encouraging natural enemies, autumn pruning to provide food till spring, the cleaning of brush and thickets near orchards. The treatment of injured trees and the cutting back of damaged or weak specimens is described.—Montana.

1088. KERR, W. L.

Report of the standing committee on rodents.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 12-16, bibl. 25, illus.

A report based on all available information on rodent injuries to horticultural crops, and rodent control, on the Canadian Prairies. Research on a larger scale is advocated.

Biological control.

1089. ULLYETT, G. C.

Insecticide programs and biological control in South Africa.

J. econ. Ent., 1948, 41: 337-9.

A logical discussion, supported by the evidence of the author's own studies in South Africa, on the possibility of combining biological and chemical control of insect pests. It is admitted that biological means alone cannot always give economic control, but the indiscriminate use of chemicals is seriously increasing the problem. The practice of applying insecticides to the cabbage moth at the peak of its abundance, for instance, will reduce the population of its natural enemies to such an extent that a serious outbreak may occur later. A carefully-timed application, however, will protect the crop during a critical period without destroying the natural control. The behaviour both of the predators and their alternate hosts must be carefully studied. The intelligent combination of chemical and biological control gave excellent results in the case of codling moth, in trials at the Fruit Research Station, Stellenbosch. Partial control of the first generation by chemicals, before the predators were active, allowed the predator population to build up to great strength,

and to deal efficiently with the second generation. Such a programme would reduce the cost of control measures considerably. The possibility of "combined" control of scale insects on citrus is discussed.

1090. ROBERTSON, P. L.

Eupteromalus sp. as a hyperparasite. Some indication of its influence on the establishment of *Angitia cerophaga* in New Zealand. *N.Z. J. Sci. Tech.*, 1948, 29, Sec. B, pp. 257-65, bibl. 14.

The history is outlined of the chalcid hyperparasite *Eupteromalus* sp. in relation to primary parasites of the diamond-back moth (*Plutella maculipennis*) and white butterfly (*Pieris rapae*). It was found to be largely responsible for heavy mortality during mass breeding of the diamond-back moth larvae parasite, *Angitia cerophaga*, in field cages.—D.S.I.R., Nelson, New Zealand.

Sprays, spraying and spray damage.

(See also 813, 893.)

1091. EDDIE, A. H.

Control of diseases and pests by spraying in commercial orchards.

N.Z. J. Agric., 1948, 77: 483-5, illus.

This article emphasizes the importance of complete coverage as a major factor in control, and indicates how such coverage may be obtained. Spray guns, fog guns or "brooms", spray rods, whorl plates and disc apertures are described and advice is given on choice of nozzle.

1092. PROVINCIAL AND DOMINION DEPARTMENTS OF AGRICULTURE, BRITISH COLUMBIA.

Control of small-fruit pests and diseases.

Victoria, B.C. [no date, received 1949], 1 sheet.

A spray programme for pests and diseases of blackberries, loganberries, raspberries, strawberries, currants and gooseberries.

1093. KEARNS, H. G. H.

Spraying of neglected orchards.

Worcestershire agric. Chron., 1948, 17: 111-17.

The old orchards of the West Country are often uneconomic from the point of view of an efficient spraying policy. Small orchards of tall standard trees would require big spraying tackle, and this might well make renovation unprofitable. A minimum spray programme of tar oil winter wash, and a pink bud and petal fall lime-sulphur spray in the first season, must be supplemented the following year, when the special needs of the orchard have been observed.

1094. MARTIN, H.

Recent developments in insecticides and fungicides. Parts I and II.

Sci. Hort., 1949, 9: 79-84, 143-9, bibl. 18.

Part I reviews the subject up to mid-1946 while Part II discusses developments in 1946-7, indicating those which seem likely to come into general application and those which are likely to remain of academic interest for some time. Among the insecticides and fungicides

discussed are: the chlorinated hydrocarbons, organic phosphorus, systemic insecticides, bordeaux substitutes, dithiocarbamates, glyoxalidines, and organic mercury compounds. The possibility of using, as a fungicide, an antibiotic produced by another fungus is briefly discussed. [See also 1118-1120 below.]

1095. FREAR, D. E. H., HILBORN, M. T., AND PRINCE, A. E.

Pest control materials, 1949.

Misc. Publ. Me agric. Exp. Stat. 613, and *Prog. Rep. Pa agric. Exp. Stat.* 4, 1949, pp. 110.

A list of 2,322 preparations sold as fungicides, herbicides, insecticides and rodenticides, with their names, makers, uses and active ingredients.

1096. POWELL, D., CHANDLER, S. C., AND KELLEY, V. W.

Pest control in commercial fruit plantings.

Circ. Ill. Coll. Agric. Ext. Serv. 634, 1949.

These recommendations for pest and disease control include spray schedules for apples, pears, peaches and apricots, plums, cherries, brambles, currants and gooseberries, grapes and strawberries. There are also notes on rodent control and on spray materials. New points in this circular are: (1) For grasshopper control growers have a choice of Toxaphene, benzene hexachloride, or chlordan. (2) For apples and other tree fruits dormant oil sprays have been increased to at least 3 gal. actual oil in 100 gal. water. (3) For late apples new materials are included in the dormant sprays. (4) In the DDT spray schedule for late apples, the time between sprays has been lengthened, and the total number of sprays reduced. (5) DDT for codling moth is suggested in northern Illinois orchards whenever other materials prove unsatisfactory. (6) For pear psylla, bordeaux-oil is suggested in place of tetraethyl pyrophosphate because of the poisonous nature of TEP to man. (7) Peach borer control with DDT. (8) All peach schedules have been strengthened by including DDT in the third cover spray and in more of the dust applications than previously recommended.

1097. GARMAN, P.

Two years of experience with mist blowers for control of apple pests.

J. econ. Ent., 1948, 41: 213-16.

The mechanical efficiency of the mist blowers now available is not sufficiently high to allow them to replace the conventional spraying machines. The problems, however, are mainly mechanical, and in theory the mist blower method has many advantages, the speed and ease of operation and the small amount of water used being the most outstanding. Results are given of some comparative experiments with a mist blower and high pressure sprayer, for the control of scab and insect pests in apple orchards.—Connecticut agric. Exp. Stat., New Haven.

1098. THOMSSEN, E. G.

Sprayers up to date.

Soap san. Chem., 1948, 24: 9: 122-4, 151; 24: 10: 145-51.

A discussion of recent improvements in spraying equipment for the application of liquid insecticides.

1099. PRATT, R. M., MASSEY, L. M., AND PARKER, K. G.

Fruit tree disease control with a new type of spray duster and mist sprayer.

Abstr. in *Phytopathology*, 1949, 39: 19.

A sprayer for fruit trees, developed at Cornell University, applies either wetted dusts or mist sprays, which are carried by an air stream delivered from a 3-inch slot 8 ft. long, set at an angle of 35° to the horizontal. There is a saving of water of about seven-eighths of that used in conventional dilute spraying. Control of apple scab, cherry leaf-spot and peach leaf curl has been equal or superior to that obtained by conventional methods.

1100. PENNEY, F. C.

Air stream sprayers on trial in Western American orchards.

Grower, 1949, 31: 154-5, illus.

A brief description of the system, and of some machines seen during a recent tour. Pacific Coast growers seem to consider that air stream sprayers give satisfactory commercial control but incline to the view that there is no more thorough method than a good man using a spray gun with plenty of pressure and volume behind it. The Speed sprayer is not universally popular, partly because of the large number of fruits blown off branches immediately above the sprayer. A machine for the small grower is described. This weighs 1,600 lb., has an aerial-flow turbine fan driven by a 12 h.p. air-cooled engine, and a spray pump, working at 3 lb. pressure, feeding 10 jets. Its fan produces 8,000 cu. ft. of air per minute with a velocity of 100 m.p.h. With this sprayer a man can spray 10 or more acres per day, working single-handed, using a small tractor. [The subject of spray-drift is not mentioned.]

1101. TASCHENBERG, E. F.

Hooded booms for grape spraying.

Bull. N. York St. agric. Exp. Stat. 732, 1948, pp. 34, bibl. 4, illus.

Wind frequently interferes with the spraying of grape vines, a difficulty which can be overcome by using canvas hoods on metal frames which cover the vines temporarily. Four types of hood are described and directions are given for their construction. Improved spraying equipment has been made for use with these hoods.

1102. AHLBERG, O.

Upprepad flygbepudring på Visingsö.
(Dusting by helicopter in Visingsö.)

Växtskyddsnotiser, 1948, pp. 61-3.

The experimental dusting by helicopter of orchards in Visingsö, carried out in 1947 [see *H.A.*, 18: 1835] had little effect on the pest population in the following year, as evaluated by grease band counts. Reasons for the failure presumably are (1) that the treatment was given too late and (2) that the dosage was insufficient, since only 60% of the 10 kg. Gesarol applied per acre is estimated to have reached the trees. The trials repeated in 1948 at an earlier date and with double the dosage seem to promise well. In view of the many telephone wires and other obstacles on the ground, which force the helicopter to fly high, Visingsö is not

a particularly suitable area for economic dusting from the air.

1103. STANILAND, L. N., AND MAJOR, J.

A small type of home-made dusting machine for ridge and rowcrop work.

Agriculture, 1949, 56: 34-8, bibl. 1, illus.

Instructions are given for constructing a light, simple, and cheap hand-drawn machine suitable for intensive holdings and small farms.

1104. BERAN, F.

Die Frostspritzung, eine Möglichkeit zur Erhöhung der Wirksamkeit ölhaltiger Winterspritzmittel. (Spraying in frosty weather, a possible means of improving the action of dormant oil sprays.) [English summary ½ p.l.]

Pflanzenschutz Ber., 1949, 2: 161-75, bibl. 5.

The application of dormant oil sprays in frosty weather resulted both in a saving in materials of 50% and in increased effectiveness against *Aspidiots perniciosus*. The following is a translation from the author's German summary: (1) The investigation of the oil deposits of different tar oil emulsions showed the great influence of surface tension on the amount of oil deposited. (2) The surface tension of such emulsions should lie within the range of 34-40 dyn. cm⁻¹. (3) The oil residue of coarsely dispersed fruit tree carbolineum emulsions is much less effective than half that of emulsions finely dispersed. (4) When applied at temperatures below 0° C., the amount of oil deposited is at least double, since there is no run-off. (5) Spraying in frosty weather resulted in greatly improved action of tar oil and mineral oil emulsions against San José scale. A 4% tar oil emulsion applied at -10° C. achieved very much better control than an 8% emulsion of the same product applied at +2° C. At temperatures below freezing a 100% kill of the pest was obtained with 2% mineral oil emulsions, while at temperatures above freezing a 5% emulsion was needed to achieve the same effect. (6) Applications of water at similar frost temperatures had no insecticidal action. (7) The effect of a lime-sulphur spray is not increased by frost. (8) The application of oil emulsions at freezing temperatures was not injurious to apple, pear, plum, cherry and bird cherry. It has not been finally shown whether the treatment can be safely applied to apricot and peach, though there is reason to believe that it can.—Bundesanst. f. Pflanzenschutz, Vienna.

1105. BRANN, J. L., Jr., AVENS, A. W., AND

DEAN, R. W.

The application of dormant oils as mists.

J. econ. Ent., 1948, 41: 180-5, bibl. 3, illus.

The application of oil emulsions to fruit trees in the form of an atomized mist can be an efficient and economic method of dormant season spraying. Atomization will reduce the amount of oil needed to produce a given coverage to one-third to one-half of that used in normal high pressure spraying. The most efficient concentration of oil was found to be 25%, as concentrations above this are too viscous to handle satisfactorily. Where eggs are sheltered by rough bark, mist sprays give less effective control than high pressure sprays.—New York State agric. Exp. Stat., Geneva.

1106. ZÄCH, C.

Ueber chemisch-physikalische Eigenschaften von Netzschwefelpräparaten. (Chemico-physical properties of wettable sulphur preparations.)

Schweiz. Z. Obst- u. Weinb., 1949, **58**: 25-7.

Analytical figures are given for the wettable sulphur preparations used in the Wädenswil spraying trials in 1948. It has not yet been possible to determine the optimum particle size for efficiency and safety. Microphotographs show particle size and distribution in the solutions of 4 preparations.

1107. SWARBRICK, T.

Atomised oils as spray carriers.

Grower, 1949, **31**: 203-5.

Some notes from a paper read by the author before the Royal Society of Arts, on 26 January, 1949. The advantages of oil sprays are set out and a guess hazarded that within 10 years commercial fruit growers will be using fungicide concentrates in atomized oil—a method that uses small quantities of spray materials, whereas conventional spraying methods require relatively large amounts of toxicants in a large volume of water. The known disadvantages of the new method are admitted, but are not regarded as insuperable.

1108. NEAL, A. L., AND OTHERS.

Influence of oil-wax emulsion sprays on size of Montmorency cherries.

J. agric. Res., 1948, **77**: 261-9, bibl. 3.

A significant increase in the size of Montmorency cherries was obtained in three separate orchards by applying 1% oil-wax emulsion sprays during fruit development.

1109. BURRELL, A. B., AND BORDEN, A. D.

Partial concentrates for air-blast sprayers.

Amer. Fruit Gr., 1949, **69**: 2: 28, 46-7.

A popular report of field tests carried out against scab in Clinton County, New York, and in deciduous orchards in California with low volume sprays in general. For scab control growers are advised to use half the normal volume of sulphur sprays at double concentration in the period before the foliage is fully developed. Work on four-fold concentration is in progress. The adjustments in spraying equipment are described which were made in California to adapt the apparatus to low volume spraying. Field tests in large Bartlett pear orchards showed that the speed ranged from 1.5 to 2 m.p.h. in dormant applications to 0.8-1.5 m.p.h. in foliage applications. New dusting equipment is under trial which incorporates the principle of using a large volume of air at a low velocity.

1110. PAYEUR, J.-B.

Les effets des fongicides et des insecticides sur le feuillage du pommier. (Effects of fungicides and insecticides on apple foliage.)

Rev. d'Okéa, 1948, **12**: 180-9, bibl. 65.

The effect on photosynthesis, respiration and transpiration of apple foliage of applications of bordeaux mixture and various types of sulphur dusts and sprays, is determined and discussed. Bordeaux mixture was found to reduce transpiration considerably. Otherwise the effect of these fungicides on transpiration and

respiration was much less marked than on photosynthesis. Lime-sulphur produced the greatest reduction of photosynthesis; in some cases this amounted to 25%. Flotation sulphur gave least reduction. High temperatures and the addition of hydrated lime or lead arsenate increased the harmful effect in most cases.

1111. TAYLOR, C. F.

A storage scald of apples caused by mid-summer oil sprays.

Abstr. in *Phytopathology*, 1949, **39**: 24.

The application of spray oils at ovicidal concentrations caused "oil scald" which appears in storage as small, sharply delimited, circular hydrotic spots, centred round lenticels.

1112. DE VILLIERS, G. D. B.

Studies relating to the physical effects of dormant oil sprays.

Sci. Bull. S. Afr. Dep. Agric. **250**, 1946, pp. 20, being *Fruit Res. tech. Ser. 7*.

Investigations were carried out to elucidate the response of fruit trees to dormant oil sprays applied to correct irregular blossoming and leafing which generally occurs after warm winters. A study was made of (a) the absorption of ultra-violet light by thin films of oil, (b) the rate of water loss from dormant twigs after the application of an oil spray. It was found that very little of the wavelengths between the solar limit ($\pm 2,900\text{ \AA}$) and $3,200\text{ \AA}$ was absorbed, and the possibility that an oil spray may limit the extent of bud injury by absorbing injurious ultra-violet radiation between those wavelengths cannot explain the beneficial effect of an oil film on the fruit buds. Oil sprays, however, were found to have a marked effect on the amount of water lost from peach twigs. A 5% oil emulsion decreased the loss of water by about 50%. In a year of intense delayed foliation, sprayed pear twigs had a greater moisture content than unsprayed ones. The conservation of water by an oil spray, especially after mild winters and before hot spells, contributes towards the beneficial effect of an oil spray in general.—Western Province Fruit Research Station, Stellenbosch.

1113. NELSON, K. E., HEWITT, B., AND BREAK, R. A.

Arsenite spray injury to grape canes through leaf scars.

Phytopathology, 1949, **39**: 71-6, bibl. 4, illus.; and

NELSON, K. E., AND HEWITT, W. B.

Arsenite injury to grape canes through leaf scars.

Abstr. in *Phytopathology*, 1948, **38**: 917.

Sodium arsenite applied as a dormant spray to canes, arms, and trunks of Thompson Seedless vines (*Vitis vinifera* L.) on dry soil plots caused sharply defined necrotic areas in the xylem tissue below the leaf scar and killed the buds. The sodium arsenite solution penetrated to the xylem tissue through the vessels of the leaf trace, and necrosis extended downwards 4 in. below the leaf scar and upwards into the bud.—University of California.

1114. ROSELLA, E.

Toute l'apiculture française se proclame en péril. (French beekeepers up in arms !)

Prog. agric. vitic., 1949, 131: 65-70.

The author deplores the non-observance of the regulation forbidding the use of synthetic insecticides* on plants when in flower, and discusses the effect of such preparations on bees. He recommends trials with phenothiazine, now incorporated in certain proprietary products such as Somax, as it is inoffensive to bees, is not injurious to game, and leaves no taste on fruit or vegetables.

1115. EMBLETON, T. W., BOYNTON, D., AND MACDONALD, H. A.

Acidification of the soil in northeastern apple orchards [of U.S.A.].

Proc. Soil Sci. Soc. Amer. 1947, 1948, 12: 370-2, bibl. 2.

Preliminary studies in 2 apple orchards are reported which tend to confirm the fear that soil acidity is rapidly increasing under McIntosh trees sprayed with elemental sulphur. The results also indicate that the inability of grass to grow under the trees and, in some cases, magnesium deficiency of the trees, may have been brought about by the resultant decrease in availability of nutrients.

Fungicides.

(See also 763, 783, 1223, 1266.)

1116. ENGLISH, H.

Disinfectant washes for the control of decay in apples and pears.

Abstr. in *Phytopathology*, 1948, 38: 914.

Various disinfectant washes were tested for the control of blue mould (*Penicillium expansum*) and bull's-eye rot (*Gloesporium perennans*) of apples, and grey mould rot (*Botrytis cinerea*) of pears, using punctured, inoculated fruit. Of the phenol derivatives tested, sodium chlororthophenylphenate proved most effective against blue and grey moulds. The quaternary ammonium compounds showed promise only in the control of bull's-eye rot.

1117. FEICHTMEIR, E. F.

The effect of particle size and solubility of sulphur in carbon disulfide upon its toxicity to fungi.

Abstr. in *Phytopathology*, 1948, 38: 914.

Among other results obtained it was found that an amorphous form of sulphur (particles approximately 2μ in diameter) was highly toxic to conidia of *S. fructicola*.

1118. LEBEN, C., AND KEITT, G. W.

An antibiotic substance active against certain phytopathogens.

Phytopathology, 1948, 38: 899-906.

A species of *Streptomyces* was antagonistic on agar to all of 33 fungi tested including three which attack fruit, viz. *Glomerella cingulata*, *Sclerotinia fructicola*, and *Venturia inaequalis*. The antibiotic is tentatively named antimycin.—University of Wisconsin.

* See also 893, 1135.

1119. LEBEN, C.

The determination of antimycin on plant leaves.

Abstr. in *Phytopathology*, 1949, 39: 13.

Antimycin, an antibiotic that has been studied as a protective fungicide, may be assayed on plant leaves by means of an agar diffusion method. Leaves of apple and tomato were included in the tests.

1120. TUKEY, H. B.

A note on the fungicidal property of actidione.*

Science, 1948, 108: 664, bibl. 1.

Reference is made to the discovery that the new antibiotic actidione is effective against powdery mildew at concentrations of 5 p.p.m. This is an instance of an antibiotic substance derived from a fungus which is effective against a plant micro-organism. There are suggestions that actidione may be effective against other fungi as well.

1121. WATKINS, G. M., AND KLEMM, D. E.

Some effects of dextrose concentration upon the action of a fungicide, 2,2'-methylenebis (4-chlorophenol).

Amer. J. Bot., 1948, 35: 622-7, bibl. 16.

Aspergillus niger was grown in culture solution, and treated with the fungicide 2,2'-methylenebis (4-chlorophenol). The growth of the fungus was studied under varying conditions of fungicidal strength, and concentration of dextrose in the nutrient solution, and it was found that low concentrations of fungicide stimulated growth when the concentration of dextrose was high. This work may be of practical use in interpreting the results of fungicidal tests.—U.S. Naval Ordnance Laboratory, Maryland.

1122. FOLSOM, D.

Comparative effects of certain sulphur fungicides on McIntosh apple trees.

Bull. Me agric. Exp. Stat. 464, 1948, pp. 31, bibl. 13.

Scab control with elemental sulphur spray was less effective on leaves, but more effective on fruits, than that of lime-sulphur spray, so that the final result in controlling fruit scab was about the same by the two methods. Lime-sulphur decreased blossom and increased early summer drop. Increase in yield from the use of elemental sulphur instead of lime-sulphur over a 10-year fruiting period was 32% or over 5 bushels per tree, at an additional cost of about 5 cents per tree for the period. Elemental sulphur, especially in dust form, increased soil acidity somewhat, but did not affect trunk girth or fruit yield.

1123. RICH, S., AND HORSFALL, J. G.

Fungicidal activity of dinitrocaprylphenyl crotonate.

Abstr. in *Phytopathology*, 1949, 39: 19.

In trials, 2,4-dinitro-6-caprylphenyl crotonate (Cr 1639), an effective acaricide, gave good control of potato blight and early apple scab and fair control of bean anthracnose and *Septoria* and *Cercospora* blight of celery. It produced some leaf scorch on all test plants except celery.

* See also 1223.

1124. PALMITER, D. H.

The effects of Fermate on the yield of McIntosh apples.

Abstr. in *Phytopathology*, 1949, 39: 18.

The continuous use of Fermate on McIntosh apple trees which received no nitrogen fertilizer over a period of 6 years increased the yield of fruit 57% over that of corresponding trees sprayed with wettable sulphur.

1125. BRAUN, A. J.

Some effects of Fermate and bordeaux sprays on Concord grapes.

Abstr. in *Phytopathology*, 1949, 39: 3.

Three applications of bordeaux mixture decreased vine growth and berry size, delayed ripening of fruit, and the vines yielded less than controls. Fermate increased vine growth and berry size and the trees gave a greater yield than controls.

Insecticides and insecticidal plants.

(See also 1212, 1213.)

1126. ARNASON, A. P.

What is new in insecticides for horticultural plants.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 51-4.

Briefly reviews the more promising new materials, including: DDT, chlordan, chlorinated camphene, benzene hexachloride, parathion, hexaethyl tetraphosphate, pyperonyl butoxide, cyclohexanone, sabadilla, and ryania. New methods and uses are discussed. Soil fumigants are briefly touched on.

1127. SWEETMAN, H. L., CLARK, E. L., AND BOURNE, A. I.

Smoke dispensers for insecticides.

Soap san. Chem., 1948, 24: 10: 141-3, bibl. 2.

The authors tested smoke aerosols of DDT, benzene hexachloride and other insecticides, dispensed from a combustible cord enclosing the chemical, against household and stored-food pests. Further trials are necessary before the method can be generally recommended.—University of Massachusetts.

1128. TAYLOR, J.

Pesticidal smokes.

Research, 1949, 2: 98-9, bibl. 4.

A brief account is given of recent investigations by Imperial Chemical Industries on the design and application of smoke-producing generators incorporating synthetic insecticides. "By use of a new technique of catalysed combustion of ammonium nitrate, it has been possible to formulate pesticidal smoke producing compositions which emit the pesticide uniformly at a temperature sufficiently low to avoid decomposition and in a physical form to give deposits of high pesticidal efficiency. The technique can be applied generally to volatile insecticides and fungicides, and provides a highly efficient method of dispersion for present and future chemical agents for pest control in industry and agriculture."

1129. GRAHAM, C.

Control of peach insects with new and old insecticides.

J. econ. Ent., 1948, 41: 217-19.

In the past lead arsenate sprays have been recommended for control of curculio on peaches. Trials, made at the University of Maryland, show that much better control is given by benzene hexachloride, with less damage to leaves and twigs. Insects that cause "catfacing", and stink bugs that cause "stings", were not controlled by benzene hexachloride, DDT, or lead arsenate. DDT, however, proved effective against oriental fruit moth, especially if two applications were given, one during the third week of July, the other during the first week of August.

1130. BROWNING, H. C., AND OTHERS.

The biological activity of DDT and related compounds.

Canad. J. Res., 1948, 26, Sec. D, pp. 282-300, bibl. 31.

Sixty-eight compounds were examined for insecticidal activity. The compounds included series of halogen analogues, reduced compounds, carbinols and their esters, ethanones, diphenylamines, and the gamma isomer of cyclohexane hexachloride. Activity was shown especially by the fluorine analogues and carbinol esters. The findings of other workers on the more important compounds are discussed. Low oil solubility was associated with low insecticidal potency (four compounds). [From authors' abstract.]—McGill University, Montreal.

1131. BROWNING, H. C., SHAPIRO, S. K., AND DUBRÛLE, M.

The insecticidal activity of DDT and related compounds against different insect species.

Canad. J. Res., 1948, 26, Sec. D, pp. 301-6, bibl. 26.

DDT and its fluoro- and methyl-analogues, its carbinol and carbinol acetate, and monochlor-DDT (1-(4-chlorophenyl)-1-phenyl-2,2,2-trichloroethane) were tested for contact insecticidal activity against two beetles (*Calandra granaria* and *Tribolium confusum*), a moth (*Ephestia kuhniella*), a plant bug (*Oncocephalus fasciatus*), and a cockroach (*Blatella germanica*). Results are here presented.—McGill University, Montreal.

1132. SQUIRE, F. A.

Note on the use of palm oil as a solvent for DDT.

Fm and For., 1948, 9: 27-8.

As a solvent palm oil offers several advantages. The solubility of DDT in palm oil is 10-20% at ordinary temperatures in West Africa, 40% at 70° C. The solution used at 5% or 10% strength gave good results as a wash applied to fruit trees against ants, and various insect pests fostered by ants, such as scales, mealybugs, aphids, and membracids. For a spray containing approximately 5% DDT the following formula is recommended:—palm oil (f.f.a. 27) 1 gal., DDT 2 lb., caustic soda 1½ oz., water 3 gal. The addition of the caustic soda to the oil solution of DDT partially saponifies it. The spray has been successfully used in Sierra Leone in combating outbreaks of the leaf-eating caterpillars of the Noctuid moth *Achaea catocaloides* Guen. on coffee plantations, and against many garden and field-crop pests. It should not be applied to cucurbits. A similar emulsion can be made using ground-nut oil.

1133. STRINGER, A.

Relation between bioassay systems and the values found for toxicity of D.D.T.

Ann. appl. Biol., 1948, 35: 527-31, bibl. 4.

The toxicities of various DDT suspensions are shown to be equivalent when compared on a weight basis.—Long Ashton Research Station.

1134. GUNTHER, F. A.

Sample manipulation and apparatus useful in estimating surface and penetration residues of DDT in studies with leaves and fruits.

Hilgardia, 1948, 18: 297-316.

Reliable methods are urgently required for estimating the amount of insecticide per unit area on fruit and foliage and especially for the assessment of these values on field sprayed material. The difficulties involved are increased with toxicants such as DDT which are partially absorbed both by the fruit and leaf tissue. A useful start in this work is reported in this paper. Empirical techniques are described for studying the magnitude of both penetration and surface residues of DDT. Field sampling methods for fruit and leaves are given. The leaf areas were measured by a photoelectric arealimeter, the fruit surfaces were estimated by means of numerical tables in which measurement of the major and minor axes are translated with the areas involved. The surface residual DDT was removed from the leaf or fruit by stripping with benzene, the DDT which had penetrated the tissues was extracted by a Soxhlet technique. After extraction and evaporation of the solvent, the DDT was estimated by the dehydrohalogenation method using an electrometric technique for determining the end point in the chloride titration.

J.K.E.

1135. WOODROW, A. W.

Tests with DDT on honey bees in small cages.

(*Mim. Publ.*) *U.S. Dep. Agric. Bur. Ent. Pl. Quar.* E-763, 1948, pp. 14.

Bees in small cages were fed, sprayed, or dusted with various DDT preparations, and the resulting behaviour and mortalities were recorded. Among other results it was found that dusts containing 5% to 10% of DDT killed practically all bees that came in contact with them, whether the bees were dusted directly or only exposed to dusted surfaces. Dusts with 2.5% of DDT were less toxic, and those of lower strength usually had little effect. DDT water spray residues, although not repellent, were persistent in effect, a single application killing nearly all bees in 5 lots consecutively exposed to it.

1136. HURST, H.

Reversible action of D.D.T.

Nature, 1949, 163: 286-7, bibl. 5.

Some unusual relationships between temperature, cuticle permeability, and metabolic activity have emerged from a study of the action of DDT on resistant insects. Observations that the primary stages of DDT poisoning are reversible have provided a clue to the mode of action of this substance and related compounds, which is analogous to that of liquid fat-solvent narcotics. The supporting evidence is briefly summarized.

1137. METCALF, R. L.

Some insecticidal properties of fluorine analogues of DDT.

J. econ. Ent., 1948, 41: 416-21, bibl. 15.

A comparative study of the insecticidal properties of 2,2, - bis - (*p* - fluorophenyl) - 1,1,1, trichloroethane (D.F.D.T.) and DDT was made at the Citrus Experiment Station, Riverside. The initial toxicity of both substances was about the same on the 12 insects studied, including greenhouse thrips and California red scale, but D.F.D.T. was more rapid in action and had less residual effect. D.F.D.T. deserves especial consideration because of its high solubility and volatility and its low toxicity to animals, by which it may overcome the problem of spray residues. [Fluorine sprays are considered too dangerous to use on food crops in England.]

1138. LUMSDEN, D. V., AND SMITH, F. F.

Growth responses by kalanchoes to DDT and other synthetic compounds.

Proc. Amer. Soc. hort. Sci., 1948, 51: 618-22, bibl. 5.

Experiments at Beltsville suggest that the extreme sensitivity of *Kalanchoe globulifera coccinea* to DDT suggests that it may perhaps be useful for detecting small quantities of this compound.

1139. SMITH, M. S.

Persistence of D.D.T. and benzene hexachloride in soils.

Ann. appl. Biol., 1948, 35: 494-504, bibl. 14.

Acid and alkaline soils, both alone and mixed with 2% of DDT or 2% of benzene hexachloride, have been exposed outdoors or subjected to controlled leaching in the laboratory. Eighteen months after treatment the benzene hexachloride soil prevented root growth of germinating seeds, while germination and early growth were normal in the DDT soils.—Wye College, Kent.

1140. SUN, Y.-P., AND OTHERS.

Comparison of toxic actions of chlordan, DDT, and gamma-benzene hexachloride to the Southern Armyworm.

J. econ. Ent., 1948, 41: 366-9, bibl. 9, illus.

The comparative effectiveness of each material as a fumigant, contact insecticide and stomach poison is determined.

1141. LORD, K. A.

The contact toxicity of a number of D.D.T. analogues and of four isomers of benzene hexachloride to *Macrosiphoniella sanborni* and *Oryzaephilus surinamensis*.

Ann. appl. Biol., 1948, 35: 505-25, bibl. 40.

The chrysanthemum aphid and the saw-toothed grain beetle were selected for these tests because (1) they were readily available in large numbers, (2) the same method of testing could be employed in each case, and (3) the test-subjects were fairly susceptible to the poison used. The biological data have been examined, as far as possible, by the method of probits.—Rothamsted Experimental Station.

1142. BOWEN, C. V.

A second list of publications on benzene hexachloride.

(*Mim. Publ.*) *U.S. Dep. Agric. Bur. Ent. Pl. Quar.* E-755, 1948, pp. 38.

This second list contains 435 titles and 13 patents, and is intended to bring the bibliography up to July 1948. The first list was issued in July 1947 under the number E-731.

1143. LEEFMANS, S.

Nieuwe bijzonderheden betreffende Parathion. (New particulars about parathion.)

Meded. Dir. Tuinb., 1949, 12: 11-15.

A review of present knowledge about the insecticide Parathion, particularly with regard to its poisonous properties and precautions necessary when using it.

1144. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

E605, an interesting new insecticide.

Agric. Gaz. N.S.W., 1948, 59: 537-8.

E605 (diethyl nitrophenyl thiophosphate), a new insecticide of German origin, known also as Parathion, Thiophos and 3422, has given promising results in Australia against the olive lace bug (*Froggattia olivina*) and green peach aphid (*Myzus persicae*) at a concentration of 1 in 10,000. Since it is toxic to man and warm-blooded animals recommendations for its use cannot yet be given.

1145. O'NEILL, W. J.

Parathion—How it is working.

Better Fruit, 1948, 43: 6: 11-12.

Parathion was used on a commercial scale by growers in the Wenatchee-Okanagan district in summer 1948. A survey of the results by the Associate Entomologist of the Tree Fruit Experiment Station, Wenatchee, shows that good control of Pacific and European red mite was achieved at a concentration of $\frac{1}{8}$ lb. per 100 gallons, but that $\frac{1}{4}$ lb. was satisfactory in many cases. No injury to foliage or fruit has been observed. The chemical proved compatible with DDT.

1146. WILSON, G. F.

HETP—a nicotine substitute.

J. roy. hort. Soc., 1949, 74: 116-21, bibl. 5.

Some notes on results obtained at Wisley during 1946-48 with HETP (hexaethyl tetraphosphate), the origin and properties of which are briefly described. The results of the tests are tabulated and expressed in terms of relative effectiveness against a number of pests, under field conditions. HETP may be regarded as a temporary, though extremely effective, substitute for nicotine, and is likely to remain so until the present difficulties of supply are overcome. It is poisonous as a concentrate to warm-blooded animals. The normal precautions as taken against nicotine should be rigidly followed. HETP is unsuitable for compounding either as dusts, or as smoke generators. It is considered that HETP is too dangerous to operators to be employed as an aerosol in the confined space of a glasshouse.

1147. FRANSEN, J. J.

Diphenylamide en phenothiazine als insecticiden. (Diphenylamide and phenothiazine as insecticides.)

Meded. Dir. Tuinb., 1948, 11: 721-3, bibl. 4.

The author concludes that these products have no great future as insecticides in Holland, since the market is already flooded with very effective preparations.

Only in special cases are they likely to give satisfaction; advantages are their rapid decomposition and relative harmlessness to warm-blooded animals and perhaps also to bees.

1148. BOTTGER, G. T., YERINGTON, A. P., AND GERTLER, S. I.

Preliminary tests on N-substituted *p*-nitrobenzamides as insecticides.

(*Mim. Publ. U.S. Dep. Agric. Bur. Ent. Pl. Quar.* E-764, 1948, pp. 10.

On the whole they compare unfavourably with the standard insecticides.

1149. DAVIES, W. H., AND SEXTON, W. A.

Chemical constitution and insecticidal action.

1. Organic sulphur compounds.

Biochem. J., 1948, 43: 461-7, bibl. 15.

The toxicities by contact and by stomach action of organic sulphur compounds of the following classes to various insects are recorded: benzthiazole derivatives and related quinoline and oxazole compounds, thio- and dithio-carbamates, substituted thiadiazines ("carbothiadines"). There is a marked selectivity in the action of the various substances against different insect species.—I.C.I. Research Laboratories, Blackley.

1150. AINLEY, A. D., AND SEXTON, W. A.

Chemical constitution and insecticidal action.

2. Substituted α -aminonitriles.

Biochem. J., 1948, 43: 468-74, bibl. 12.

The insecticidal properties of a series of substituted α -aminonitriles have been examined, and marked activity found in certain compounds. There is marked specificity in the resistance of different insects to individual compounds. α -phenylmethylaminoctoic nitrile, $C_6H_5(CH_3)_2N.CH(C_6H_5)CN$, and $\alpha\beta$ -bis (α' -cyano- α -heptylamo) ethane, $[-CH_2NH.CH(C_6H_5)CN]_2$, have aphidical activity only slightly less than that of dodecyl thiocyanate or nicotine. The mode of action of these insecticides is discussed in relation to their chemical reactivity and their physicochemical properties. [Authors' summary.]—I.C.I. Research Laboratories, Blackley.

1151. SMITH, E. H., AND PEARCE, G. W.

The mode of action of petroleum oils as ovicides.

J. econ. Ent., 1948, 41: 173-9, bibl. 14.

The way in which petroleum oils affect the respiration of insect eggs is investigated, using the paraffin oil known as 46-M20, and the eggs of the oriental fruit moth, *Grapholita molesta* (Busck) as material. Measurement of oxygen consumption showed that control efficiency, dosage of oil, and decrease in respiratory rate are directly related. The oldest eggs are the least susceptible. There is some indication that eggs produce a toxic gas during their development which, if prevented from escaping by a coating of oil, will accumulate inside the egg, causing death.

1152. HEYDECKER, W.

New sprays for an old pest [woolly aphid].

Grower, 1949, 31: 23-4.

A short account of trials in an English walled garden of some old and new chemical sprays, Thiol, HETP, and others.

1153. TATTERSFIELD, F., AND OTHERS.

Insecticides derived from plants.

Kew Bull., 1948, 3: 329-49, bibl. 41.

A report on tests for insecticidal activity carried out on a number of British, tropical and Chinese plants. The earlier tests were all made with extracts of the ground-up material. Later it was found that the ground material itself could show definite toxicity where little or none showed in an extract. When tested as extracts, although some of the British plants possessed some insecticidal properties, none was of a sufficiently high standard to be worth further examination, with the possible exception of the fruits of *Euonymus europaeus*. Extracts of tropical plants showed some activity as contact and stomach poisons or as repellents, but none approached in potency known plant or synthetic insecticides. When tested as powders, *Randia nilotica* (root) from Nigeria and *Randia dumetorum* from Ceylon showed some toxicity. Of the Chinese plants *Milletia pachycarpa* deserves most consideration as an insecticide of the derris class, although not so powerful in its toxic action as the most recent strains of *D. elliptica* root. The fact that the seed possesses insecticidal properties adds interest to this plant. The seeds should be easier to harvest than the roots. With this plant, too, notable differences in activity were found when extracts were compared with the ground-up material. *Derris fordii* (root), *Tripterygium wilfordii* (root bark) and *Rhododendron molle* (flowers) all showed definite insecticidal activity as powders. Some of the differences in effect between extracts and powders may be due to specificity, but there seem to be other important factors, which cannot as yet be established. [From authors' summary.]

1154. PAGÁN, C., AND LOUSTALOT, A. J.

A simple rapid method for estimating toxicity (rotenone equivalent) of derris root.

J. agric. Res., 1948, 77: 271-7, bibl. 1.

The method described is based on the absorption of light by the toxic constituents of the roots, dissolved in acetone and measured in a spectrophotometer at 360 m μ . Transmittance values of *Lonchocarpus* root did not correlate with the biological rotenone equivalent.—Puerto Rico Federal Experiment Station.

1155. VAN HEETEREN, H. V. A.

Mogelijkheden voor de cultuur van Pyrethrum (*Chrysanthemum cinerariaefolium* Vis.) op Java. (The possibility of cultivating pyrethrum in Java.)*Meded. alg. Proefst. Landb. Buitenzorg* 73, 1948, pp. 18, bibl. 1.

This article begins with a review of the conditions under which pyrethrum is grown in different parts of the world. Seed was introduced into Java from Japan in 1933 and from Kenya in 1936. It can be grown with advantage only at 1,800 metres or more above sea level. The points discussed are soil and climate, propagation, cultural operations, processing and the sale of the product. The area of suitable soils above 1,800 m. is small and Indonesia can occupy only a modest place on the world market.

1156. EDWARDS, M. G.

The pyrethrin contents of undried flowers, *Chrysanthemum cinerariaefolium*, determined by extraction with petrol ether.

J. Soc. chem. Ind. Lond., 1948, 67: 379-82, bibl. 7.

“The chemical evaluation indicates that the undried flowers contain about the same amount of pyrethrin I and about 10% more pyrethrin II than the same flowers dried by the most favourable natural or artificial means.”—East African Industrial Research Board, Nairobi.

1157. HENDRICKX, F. L.

La pourriture des capittules du pyréthre (*Chrysanthemum cinerariaefolium* (Trev.) Bocc.). (Rot of pyrethrum capitula.)

Parasitica, 1948, 4: 186-8, bibl. 6.

A rot of pyrethrum capitula in the Belgian Congo is caused by *Ramularia bellunensis* Speg. The rot starts as the plants come into flower, attacking the buds not yet open. The symptoms are compared with those caused by *Botrytis cinerea*. Recommendations for control are good cultivation, and the removal and burning of all diseased stems. [This disease was reported from Kenya in 1947. See *H.A.*, 17: 2564.—ED.]

1158. LITTLE, E. L.

Heliopsis longipes, a Mexican insecticidal plant species.

J. Wash. Acad. Sci., 38: 269-74, bibl. 15.

Chilcuague, a Mexican herbaceous plant of possible commercial value as a source of insecticide and previously designated as “*Erigeron affinis*”, has been identified as *Heliopsis longipes*. It is found in forests of *Quercus* spp. at altitudes of 1,825 to 2,250 metres. The fleshy roots are the source of the insecticidal principle. Because of its rarity, cultivation would be necessary to supply commercial quantities of the roots. Wild plants were transplanted successfully on a small scale. [From author's summary.]

1159. WHITE, D. G., PAGÁN, C., AND MANGUAL, J. C.

The effects of mulching *Derris elliptica*.

Trop. Agriculture Trin., 1947, 24: 131-6, bibl. 5, illus. [received 1949].

Mulching was found to be associated with higher soil moisture contents and lower soil temperatures than in check plots during dry weather and the hot period of each day. Considerably less labour was required to weed derris mulched with grass leaves than derris mulched with derris debris or not mulched at all. Mulching did not seem to influence the amount of labour involved in harvesting the roots. The yield of roots from derris mulched with sugar-cane or lemon grass leaves was usually significantly higher than from check plots not mulched. The rotenone content of derris roots was not adversely affected by mulching and in some instances was higher than in roots from check plots. The actual yield of rotenone per unit number of mulched plants was generally higher, and in some instances significantly higher, than from check plants. Unrooted cuttings of derris were placed directly in the field under mulch and one year later

more than 86% of those mulched with 6 in. of lemon grass leaves had developed into vigorous plants. [From authors' summary.]

Fumigation.

1160. BACHMANN, F.
Pflanzenvergasung mit mobiler Zelle.
(Plant fumigation in mobile tanks.)
Schweiz. Z. Obst- u. Weinb., 1949, **58**: 43-4.

A description of mobile tanks in which HCN fumigation of nursery material against San José scale is carried out.

1161. POOTJES, J. R.
Methylbromide als fumigatiemiddel.
(Methyl bromide as a fumigant.)
Landbouw, 1948, **20**: 391-9, bibl. 17.

A survey of the application of methyl bromide as an insecticide and soil fumigant, its effect on the germination of seeds, its toxicity to humans, and various methods of fumigation.—Institute for Plant Diseases, Buitenzorg.

1162. JACKS, H.
Disinfection of glasshouse soil. Control of soil-borne diseases and pests by application of heat or chemicals.
Bull. N.Z. Dep. Agric. **314**, 1948, pp. 12, illus.

An account is given of methods of disinfecting glasshouse soil by heat (the Hoddesdon pipe system is described and illustrated) and by the injection of fumigants, viz. chloropicrin, D-D, carbon disulphide, methyl bromide and Iscobrome II (a mixture of 25% chloropicrin, 15% methyl bromide, and 60% xylol). A soil injector designed by the Plant Disease Division, D.S.I.R., New Zealand, is illustrated. Precautions that should be taken in using the irritant fumigants are stressed. An appendix discusses the application of soil fumigants in the field.

e DEAN, R. W.
Plum curculio control with chlorinated hydrocarbon insecticides in 1947.
J. econ. Ent., 1948, **41**: 524-5, bibl. 1.

f DUTTON, G.
New methods of firepot filling aid frost fighters.
Orchard. N.Z., 1948, **21**: 18-19, illus.

g FELIX, E. L.
Copper naphthenate dust and spray.
Abstr. in *Phytopathology*, 1949, **39**: 7.
Methods of preparation are mentioned.

h FISCHER, H.
Die gesetzlichen Unterlagen für den Pflanzenschutz im Obstbau. (Legal obligations in the control of fruit tree pests and diseases in Switzerland.)
Schweiz. Z. Obst- u. Weinb., 1949, **58**: 40-3.

i GOODALL, D. W.
Studies in the diagnosis of mineral deficiency IV. The mineral content of barley plants in relation to potassium deficiency.
Ann. appl. Biol., 1948, **35**: 605-23, bibl. 7.

j GORLIA, E.
Pulvérisations des arbres fruitiers. Les composés mercuriques dans le lutte contre la tavelure. (Mercury preparations used against apple and pear scab.)
Fruit belge, 1949, **17**: 13.
Results were discouraging.

k GRAHAM, L. T.
Criteria of effect used in determining codling moth injury.
J. econ. Ent., 1948, **41**: 70-5, bibl. 5.

l GROEN, P.
On radiational cooling of the earth's surface during the night, especially with regard to the prediction of ground frosts.
Meded. ned. met. Inst. de Bilt, Series B.1, Nr. 9, Rijksuitgeverij, The Hague, 1947, pp. 35, Fl. 2,50; abstr. in *Met. Mag.*, 1949, **78**: 88.

m HAINES, K. A., AND DAVIS, L. G.
Protection of workers applying nicotine alkaloid as a concentrated mist spray.
J. econ. Ent., 1948, **41**: 513, bibl. 1.

n HERMANN, F. J.
Studies in *Lonchocarpus* and related genera. IV. The *Lonchocarpus rugosus* complex and additional Middle American species.
J. Wash. Acad. Sci., 1948, **38**: 310-12.

o MINISTRY OF AGRICULTURE, LONDON, AND DEPARTMENT OF AGRICULTURE FOR SCOTLAND.
Proprietary products for the control of plant pests and diseases.
(*Publ. out of series*) *Minist. Agric. Lond.*, 1949, pp. 6.

p PEMBERTON, E. J.
Rabbit control measures, poisoning, fumigation, digging out.
J. Dep. Agric. Vict., 1949, **47**: 73-7.

Noted.

1163.

a BERAN, F.
Neue Wege im Pflanzenschutz. 2. Fungizide. (New methods in plant protection. 2. Fungicides.)
Bodenkultur, 1948, **2**: 43-8, bibl. 34.
For Part 1, on synthetic insecticides, see *ibid*, 1947, **1**: 56-68.

b BERCK, B., AND SMALLMAN, B. N.
Chemical methods of measuring DDT.
Sci. Agric., 1949, **29**: 53-9, bibl. 22.

c BRUNSON, M. H., AND ALLEN, H. W.
Oriental fruit moth cocoon parasites.
J. econ. Ent., 1948, **41**: 446-50, bibl. 7.

d CYPRUS DEPARTMENT OF AGRICULTURE.
Plant pest and disease calendar.
Leaflet. (Educ. Ser.) Cyprus Dep. Agric. **22**, [no date], pp. 8.

q RICHARDSON, C. H.
A system of sampling and rating codling moth infestations.
J. econ. Ent., 1948, 41: 75-9, bibl. 6.

r SCHNEIDER-ORELLI, O.
Die Maikäferflugjahre in der Schweiz nach dem Stande der Untersuchungen von 1948. (Cockchafer flight years in Switzerland, based on studies brought up to date.)
Schweiz. Z. Obst- u. Weinb., 1949, 58: 105-9, bibl. 6, with a coloured map.

s SIMMONDS, F. J.
Some difficulties in determining by means of field samples the true value of parasitic control.
Bull. ent. Res., 1948, 39: 435-40.

t TUNBLAD, B.
Iakttagelser och rön från årets bekämpningsmedels-prövningar. (A discussion of the year's insecticide tests.)
Växtskyddsnotiser, 1948, pp. 65-70.

u YOTHERS, M. A., AND CARLSON, F. W.
Effect of DDT on the green peach aphid and its coccinellid predators.
J. econ. Ent., 1948, 41: 515-16.

v WILLERMAIN, M.
Généralisation de la méthode d'analyse de Thorpe et application au dosage de l'isomère γ dans l'hexachlorcyclohexane technique. (A generalization of Thorpe's method of analysis, and its application in the determination of the γ -isomer in technical benzene hexachloride.)
Analyst. Chim. Acta, 1949, 3: 206-21, bibl. 4, illus.

w WILSON, E. E.
Relation of temperature and moisture to the effectiveness of sodium pentachlorophenate as an eradicator spray against *Sclerotinia laxa*.
Abstr. in *Phytopathology*, 1948, 38: 919.

WEEDS AND WEED CONTROL.

Particular weeds.

1164. ORCHARD, H. E.
Weeds of South Australia. Dyer's weed (*Reseda luteola* L.) and related species.
J. Dep. Agric. S. Aust., 1949, 52: 277-8.
Dyer's weed (*Reseda luteola*), cut leaved mignonette (*R. lutea*), white mignonette (*R. alba*) and common mignonette (*R. odorata*) are described. The last two are not widespread. Control measures for the first two are spraying with sodium chlorate or Atlacide, $\frac{1}{2}$ lb. per gal. of water; arsenic pentoxide, 2 lb. to 5 gal.; sodium arsenite, 1 pint to 39 pints of water, and hormone type weed-killers (such as Methoxone, Weedone, and other 2,4-D types), 1 pint to 4 gal. water.

1165. SCHMITZ, A.
La répartition et la fréquence des plantes commensales des cultures en fonction du pH du sol en Belgique. (The distribution and frequency of arable weeds in relation to soil pH in Belgium.) [English summary.]
Bull. Inst. agron. Gembloux, 1946, 15: 18-78, bibl. 63 [received 1948].
The author works out a frequency curve in terms of soil pH for many weeds of cultivated soil, and on this basis classifies them as indicators of acid, neutral, or basic soils, or as indifferent. He describes how the pH value of a soil may be determined by examination of the plant association of the field.

1166. HOLLOWAY, J. K.
Biological control of Klamath weed—progress report.
J. econ. Ent., 1948, 41: 56-7, bibl. 2.
Colonization of *Chrysolina hyperici*, *C. gemellata*, and *Agrilus hyperici*, parasites on the Klamath weed (*Hypericum perforatum*) was attempted in California, following the successful introduction of these beetles into Australia 8 years previously. Before releasing the parasites, satisfactory feeding tests were made on sugar beet, flax, hemp, sweet potato, tobacco and cotton. The importation from Australia, testing, and colonization were undertaken by the Bureau of Entomology and Plant Quarantine and the University of California. Colonization of both *Chrysolina* species has been successful, but the number and extent of the colonies must be increased before the project becomes independent of importations.

1167. BLACKMAN, G. E., AND HOLLY, K.
The control of hoary pepperwort.
Agriculture, 1949, 56: 6-11.
A short note on the introduction of this noxious weed (*Cardaria (Lepidium) draba*) into England, at the beginning of the nineteenth century, is followed by a detailed account of investigations, begun in 1945, into control methods, using growth-regulating substances. The complexity of the problem excludes the use of simple control methods. Recommendations are made which involve a special cropping and spraying programme extending over 3 years. On infested land two autumn-sown cereals should be grown in successive years, followed in the third year by a spring-sown crop which must also be resistant to the MCPA or DCPA spray used against the pepperwort. If a spray of MCPA is used, it should be applied, at 2 lb. per 100 gal., when the flower buds of the pepperwort are forming, but if DCPA is used then a 0.2% spray should be used when the pepperwort is in flower. Two successive yearly sprayings can give almost complete eradication of the weed, but a third year's treatment is recommended as an insurance.

1168. WILLIAMS, J. R.
A preliminary account of the project for the control of *Cordia macrostachya* (Jacq.) Roem. and Schult (Herbe Condé), in Mauritius.
Rev. agric. Maurice, 1948, 27: 214-33, bibl. 9.
The causes of the rapid spread and the present abundance of the noxious weed *Cordia macrostachya* in

Mauritius are enumerated. Biological control methods have been adopted, two leaf-eating insect species, *Physonota alutacea* and *Schematita cordiae*, having been imported from the West Indies, the home of *C. macrostachya*. The method of selecting suitable insects, the precautions taken, and the results achieved are discussed. Investigations are in progress prior to the release of certain flower- and seed-destroying insect species, e.g. *Eurytoma* n.sp., a seed parasite, and *Chloropteryx* n.sp., a flower feeder.

Weed control.

(See also 759.)

1169. MINISTRY OF AGRICULTURE, LONDON.

Suppression of weeds.

Advis. Leaflet. Minist. Agric. 52, 1948, pp. 5.

Deals very briefly with the following aspects of the subject: prevention of seeding, clean seed, ploughing, cultivation, hoeing, pulling, fallowing, liming, drainage, manuring, smother and cleaning crops, sheep grazing, spraying, dusting, and compulsory destruction of weeds. Reference is made to 11 other Ministry advisory leaflets dealing with weeds, including No. 315 which deals with selective herbicides.

1170. HESTER, J. B., AND ISAACS, R. L.

Cultivation is necessary.

Science, 1948, 108: 635.

Inspection of a number of carrot fields in eastern Pennsylvania in 1947 revealed a very compact and unsatisfactory soil condition resulting from, among other things, a lack of satisfactory cultivation. This was due primarily to the lack of the necessity for cultivation due to the use of certain weed-control substances. Yields were phenomenally low. Subsequent experiments, in 1948, with carrots in N. Jersey and Pennsylvania, to study the influence of cultivation on crop growth, gave highly significant results, showing that under the conditions of these experiments cultivation was a deciding factor in crop yield. In view of the present interest in chemical weed-control, these results warrant careful consideration.

1171. ROBBINS, W. W.

Os últimos progressos no combate às ervas daninhas. (Recent progress in weed control.)

Ceres, Vicoso, 1948, 7: 376-82, illus.

After a general introduction the author discusses selective herbicides, general contact herbicides, control of weeds before the emergence of the crop plants, the application of herbicides in small volumes (growth regulators), and treatment in orchards and vineyards not under cultivation.

1172. SPANGELO, L. P.

Weed control in vegetable crops with selective herbicides.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 4th annu. Meet., 1948, pp. 54-7.

A brief summary is given of the recommendations made by U.S.A. workers for using the following herbicides: oil sprays, sulphuric acid, 2,4-D, and cyanamid. A summary of the results from trials of 2,4-D and oil sprays at Manitoba University in 1946-47 is included.

1173. BLACKMAN, G. E.

Selective weed control in horticulture.

Sci. Hort., 1949, 9: 117-22, bibl. 13.

This paper deals with developments up to 1946. The author concludes with the statement that "the impetus of recent discoveries will lead on to fresh ones and some of these will undoubtedly affect future horticultural practice. How great will be the effects it is impossible as yet to say, for all the past discoveries in this field stress the unpredictability of biological research".

1174. AKESSON, N. B., AND HARVEY, W. A.

Chemical weed-control equipment.

Circ. Calif. agric. Exp. Stat. 389, 1948, pp. 43, illus.

A well-illustrated handbook for Californian farmers which describes the different types of sprayers, from knapsack to aeroplane types, and explains how to select the right type for a specific job. A special section is devoted to calibration. Specific weed-control problems are not discussed. The handbook should also prove useful to manufacturers of sprayers, since it indicates the desirable features in design and describes methods which are proving successful.

1175. PADWICK, G. W.

Chemical control of weeds.

Indian Fmg, 1948, 9: 497-500, illus.

Mainly concerned with the growth regulator type of herbicide and its possibilities in India, where striking results have been obtained with methoxone (½ lb. per acre) against the water-hyacinth. Other water weeds are likewise destroyed, including *Pistia lanceolata* and *Salvinia auriculata*. A list is given of 16 major weeds of arable land in India which are killed by methoxone. This herbicide also gives striking results against parasitic weeds such as *Striga*. The mechanics and economics of application and the risks involved are discussed. Suggestions are made for future research.

1176. RAVAUT, L., AND LHOSTE, J.

État actuel du désherbage chimique des plantes cultivées. (The present state of chemical weeding of cultivated plants.)

Rev. int. Bot. appl., 1949, 29: 315-16: 34-49, bibl. 77, illus.

A brief review of present knowledge of chemical herbicides including: potassium ethylxanthate, pentachlorophenol, dinitrocresol, dinitrophenol, phytohormones, isopropyl-n-phenylcarbamate, oils, and paraffins.

1177. DIRECTIE VAN DE LANDBOUW.

Onkruidbestrijding met chemische middelen. (Controlling weeds with chemicals.)

Meded. PlZiekt. Dienst 111, 1949, pp. 24, illus.

Weed-control measures are discussed under introduction, general phytocidal preparations (e.g. sodium chloride), weeds in grassland (with lists of weeds with their common Dutch and their scientific names), selective weed-killers (calcium cyanamide, DNC-containing preparations, growth-regulating substances and hydrocarbons), and general note on weed control.

1178. PLANTENZIEKTENKUNDIGE DIENST, WAGEN-
INGEN.

Bericht over beschikbare onkruidbestrij-
dingsmiddelen. (Report on available weed-
killers.)

Bericht *PlZiekt. Dienst* 787, 1949, pp. 2.

A list of proprietary weed-killing preparations available in Holland, with names and addresses of firms supplying them.

1179. WINDERS, C. W.

Hormone weedkillers [for Queensland].

Qd agric. J., 1948, 67: 195-9.

A practical article for farmers describing the action of hormone herbicides. A list of those on the Queensland market is followed by instructions for using them and a warning about necessary precautions. There is a list of over 100 local plants classified under susceptible, somewhat susceptible, and resistant. Susceptible and resistant crops are also listed.

1180. CRAFTS, A. S., AND EMANUELLI, A.

Some experiments with herbicides in pine-
apples.

Bot. Gaz., 1948, 110: 312-19, bibl. 9, illus.

Greenhouse and field trials were carried out at the Puerto Rico Agricultural Experiment Station to discover a chemical weedkiller that could safely be used on pineapple plantations. In field conditions all of the 8 commercial oil fractions tested proved damaging to pineapples, and a dinitro selective weedkiller injured pineapple leaves without killing grasses. A fortified oil emulsion spray, however, gave very good weed control, and could be used without injury to the crop, provided the plants were shielded from direct application. Preliminary tests indicate that the use of 2,4-D and of temporary soil sterilization are worth further investigation.

1181. TIRELLI, M.

Sensibilità del tabacco ai trattamenti con
erbicidi fitormonici. (The effect of hor-
mone weed killing on tobacco.)

Il Tabacco, 1948, 52: 259-62.

Trials with 2,4-D in dust and solutions varying in strength from 1·0% to 0·10% showed serious damage to tobacco from all except the 0·10% treatment.

1182. MILLAR, W. A. R.

High-volume sprayer for hormone weed-
killers.

N.Z. J. Agric., 1948, 77: 575, illus.

A high volume, high pressure spraying machine for the application of hormone weedkillers is described.

1183. TEMPLEMAN, W. G.

Low volume sprayers for weed control.

Agriculture, 1949, 55: 441-3.

Describes the type of equipment used in 1948 trials of low volume (5-7 gal. per acre) spraying of 2-methyl-4-chloro-phenoxyacetic acid (M.C.P.A. or Methoxone) for weed control under British conditions. The details given can serve as a basis for the construction of other low volume sprayers.—Jealott's Hill Research Station.

1184. BROWN, A. L., AND McILVAIN, E. H.

Suggested techniques for testing airplane
application of herbicides.

Agron. J., 1949, 41: 96-7, illus.

Some notes on the equipment necessary, and practices that should be observed, when applying 2,4-D weed-killer from the air to experimental plots.—U.S. Southern Great Plains Field Station, Woodward, Okla.

1185. BROWN, J. F.

D.N.O.C. sprays useful weedicide in onion
crops. Summary of results of recent trials
carried out in Canterbury.

N.Z. J. Agric., 1949, 78: 31-2.

The trials described show that DNOC sprays are a useful weedicide for onion crops. The relevant weeds are listed according as they are: susceptible in all stages of growth, susceptible only when young, susceptible only before two-leaf stage, damaged severely but roots not affected, resistant. Any simple sprayer can be used for the application of DNOC sprays and the commercial preparation of the sodium salt does not have to be stored in special containers and is not corrosive.

1186. EVANS, L. S., MITCHELL, J. W., AND
HEINEN, R. W.

Using 2,4-D safely.

Fmr's Bull. U.S. Dep. Agric. 2005, 1948,
pp. 10.

2,4-D is a potent selective herbicide but it must be used with caution or injury to crop plants may result. Its effect on weeds and crop plants is described, and lists are given of plants sensitive and resistant to its action. Precautions to be observed when using it are emphasized.

1187. WEAVER, R. J.

Some uses of activated carbon in contra-
toxication of plant growth-regulators.

Bot. Gaz., 1948, 110: 300-12, bibl. 2, illus.

In field experiments at Chicago University, activated carbon (Norit A) was applied to soil and plants that had been treated with ammonium 2,4-dichlorophenoxyacetate, in order to determine whether this growth substance was adsorbed, and damage to the plant prevented. The aim was to devise a means by which germinating seeds could be protected from damage by pre-emergence applications of hormone weedkiller. A concentration of 1,000 p.p.m. Norit A in soil covering a row of seeds gave effective protection to the germinating plants, and retained its adsorptive capacity for at least 12 days. Coating the seeds of red kidney bean before sowing gave partial protection, but coating the seeds of pea, soybean and wheat was ineffective. Dusts of Norit A, Nuchan 2A, and Nuchan C-115 were also found to protect young plants against subsequent applications of several growth regulating substances.—University of California, Davis.

1188. BROWN, A. L.

An improved spray machine for experimental
plot and field work.

Agron. J., 1949, 41: 47-8, illus.

A commercial spraying machine is described, for application of 2,4-D in high concentration, low volume sprays, that has been used satisfactorily for weed

control on large fields and sagebrush pasture land, and yet is sufficiently accurately calibrated for use in experimental work, and on small plots. It has been tested for 6 months by the U.S. Southern Great Plains Field Station, Woodward, Okla.

1189. KELLY, S.

The influence of temperature on the susceptibility of plants to 2,4-D.

Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 810.

Kidney bean, perennial rye grass and crab-grass all showed greater susceptibility to effects of 2,4-D at 25° C. than at 5° or 15°. Even when the plants were moved to a higher temperature a week after treatment, the amount of killing was increased. The temperature of pre-treatment also caused variation in response.—Vassar College, Poughkeepsie, N.Y.

1190. FELBER, I. M.

The formation of protuberances on bean leaves in response to 2,4-D treatments.

Amer. J. Bot., 1948, 35: 555-8, bibl. 6, illus.

A description is given of the anatomical structure of outgrowths appearing on both surfaces of bean leaves as a result of injection with this growth substance. They occur only on leaves with considerably reduced mesophyll, and it is suggested that they are the result of compensative growth, following the inhibiting effect of 2,4-D on normal development. Their development was found to depend very little on external factors, although they could not be induced in a saturated atmosphere. An increase in the activity of the respiratory enzyme, peroxidase, occurred in the proliferated tissue. This commonly occurs in all abnormal outgrowths, whether caused by freezing, wounding or chemical agents, and suggests that the principal changes in metabolism may be the same.—Michigan State College.

1191. WATSON, D. P.

An anatomical study of the modification of bean leaves as a result of treatment with 2,4-D.

Amer. J. Bot., 1948, 35: 543-55, bibl. 8, illus.

Observations of the location and type of injury occurring when a young bean plant is injected with a solution of 2,4-D show that injury only occurs in the bud. A careful study of the reaction of tissue to this growth substance, at various stages of development, indicates further that leaf tissue is most vulnerable at the stage of cell differentiation, and the presence of a stimulus at this stage will alter normal cell development. Leaves in the same bud, slightly older or younger at the time of treatment, are less severely injured. The number of leaves injured in each bud is rarely more than 5, as the effect of 2,4-D in the plant does not persist, and the initiating region itself is not affected. Distortion is due to inhibition of the lateral meristem, and proliferation of "replacement tissue", thick-walled parenchyma tissue, with few intercellular spaces and few chloroplasts.—Cornell University.

1192. CAPINPIN, R. I., AND OCFEMIA, G. O. Study of weed eradication with 2,4-D in lawns, vacant lots, and pastures [in Philippines]. *Philipp. Agric.*, 1948, 31: 239-55, bibl. 25, illus.

Includes a list of 49 species of tropical weeds which can be effectively controlled by a single application of 2,4-D spray at 1,000 p.p.m. Also a list of 8 species which tolerate 2,4-D.

1193. CRAFTS, A. S., AND EMANUELLI, A.

Combination of 2,4-D with fortified oil-emulsion contact herbicides.

Bot. Gaz., 1948, 110: 148-54, bibl. 4, illus.

Where 2,4-D has been used repeatedly to spray weeds in sugar-cane fields, susceptible weeds have been replaced by resistant grasses, and this results in a worse situation than the original one. An oil emulsion contact spray, however, that kills grasses, does not control the day flower (*Commelina* sp.), bindweed (*Ipomoea* sp.) or nut grass (*Cyperus rotundus*). Field trials, made at Puerto Rico Experiment Station on sugar-cane plantings, proved conclusively that the combination of 2,4-D with an oil emulsion spray is a very effective means of controlling mixed weed populations. Use of the ester formulation of 2,4-D increased the stability and wetting power of the emulsion, and seemed to increase the toxicity to grasses, especially Bermuda grass. A combination spray is formulated for use in sugar-cane fields, both in the pre-emergence stage and on the growing crop. It is suggested that it might also be used in maize fields.

1194. JOHNSON, A.

Selective hormone-type weedicides. Methoxone and 2,4-D preparations.

Agric. Gaz. N.S.W., 1948, 59: 581-3.

The results of tests carried out in New South Wales are summarized in a table, where the weeds are listed as: susceptible in growth stages tested, susceptible in seedling stages only, moderately susceptible, and resistant for practical purposes.

1195. DOXEY, D., AND RHODES, A.

The effect of the plant growth-regulator 4-chloro-2-methyl phenoxyacetic acid on mitosis in the onion (*Allium cepa*).

Ann. Bot. Lond., 1949, 13: 105-11, bibl. 18, illus.

This growth substance, used commercially as the weedkiller Methoxone, or M.C.P.A., will cause swellings in the region of the root tip similar to those caused by mitotic poisons, and it was considered possible that the inhibition of root growth caused by M.C.P.A. might be related to its action on mitosis. This paper represents the first stage of an investigation into the mode of action of M.C.P.A. from a cytological point of view. Although mitotic irregularities are certainly produced by high concentrations of M.C.P.A., further work is required to determine whether these are the cause of root growth inhibition. The similarity of effects of M.C.P.A. to those of X-irradiation and mustard gas is discussed.—Jealott's Hill Research Station.

VEGETABLES AND MISCELLANEOUS TEMPERATE CROPS

General.

1196. ALVIM-CARNEIRO, P. T.

Vernalização de plantas hortícolas. (Vernalization of horticultural plants.) [English summary.]

Ceres, Vicosia, 1948, 7: 297-320, bibl. 61.

A review of the literature on the effect of temperature on the development of vegetable crops. After a general introduction the vernalization requirements are set out for celery, lettuce, potatoes, beetroots, onions, carrots, peas, spinach, turnip, cucumber, pepper, cabbage, and tomatoes.

1197. BONVICINI, M.

Miglioramento genetico nell'attività sperimentale 1946-47. (Breeding experiments for plant improvement in 1946-47.)

(Pubbl.) *Istituto di allevamento vegetale per la cerealicoltura, Bologna*, 1948, pp. 78.

A brief account is given of progress in attempts to produce plants more desirable in particular characters. Among those on which work is reported are: tomato, onion, cauliflower, lettuce, peas, dwarf beans, soya beans, castor bean, sunflower, hemp. No startling progress is reported, but the main scheme of work on each crop plant is apparent.

1198. BEALE, C.

Climate and vitamin content.

Bett. Crops, 1949, 33, p. 34.

A brief summary of the results of investigations at the Florida Agricultural Experiment Station into the nutritive value of vegetables. Climate was found to have a more important influence on the organic composition of crops than soil conditions. Beans that have received insufficient moisture for good growth have a higher vitamin C and carotene content than beans from an irrigated crop, and broccoli grown in late spring contains about 50% more carotene than winter broccoli.

1199. CARNCROSS, J. W.

Declining vegetable yields challenge New Jersey farmers.

Circ. N.J. agric. Exp. Stat. 519, 1948, pp. 7.

Decreasing yields are due to soil erosion and a decline in the organic matter content of the soil. The remedy would appear to lie in the inclusion of a grass sod crop in the rotation, though this is bound to cause a temporary drop in income.

1200. WALKER, J. C.

Vegetable seed treatment.

Bot. Rev., 1948, 14: 588-601, bibl. 70.

In this summary of the development and practice of seed disinfection, disinfection, and protection, a table of current recommendations for seed treatment of various vegetables is included. The effect of the new organic protectants is so variable that "research into the nature of the interaction of each with host, pathogen and environment is the greatest present need. Exploration for better compounds may thereby become less empirical".

1201. KASERER, H.

Die Beeinflussung der Samen der Kulturpflanzen durch Auslese und Ernteverfahren. (The effects of selection and harvesting on the seed of cultivated plants.)

Bodenkultur, 1948, 2: 184-7, bibl. 2.

Another article on "Porro", a dust applied to seed as a fertilizer [see also *H.A.*, 18: 1583]. The selection of cultivated plants has disregarded the character of seed viability. Moreover, when a crop is harvested, not all seeds are fully ripe. Hence, seed fertilization is called for, which, incidentally, is the only means of increasing the vigour of the seedling without at the same time benefiting weed seeds. The tabulated data on the effect of "Porro" refer to cereals and rape, but it is claimed that horticultural *Brassicaceae* have also been treated successfully.

1202. HENKES, H. J. M.

De teelt van tuinbouwzaden. (The production of garden seed.)

Tuinbouw, 1948, 3: 286-8, illus.

The climate and soil of Holland are very favourable for the production of seeds of garden plants, particularly of vegetables and flowers, and West Friesland is its most important centre. The total area under seed production in Holland increased from 5,645 ha. in 1938 to 11,287 ha. in 1947.

1203. FREW, S.

Production of flower and vegetable seeds on the Wairau Plains of Marlborough.

N.Z. J. Agric., 1948, 77: 324-34, illus.

The Marlborough district of New Zealand is particularly suitable for producing flower and vegetable seeds, because of its favourable soil and climate. The methods employed there, however, allowing for differences in planting and harvesting dates because of climatic variations, should be suitable for most parts of the Dominion. Notes are given on the danger of cross-pollination (particularly in *Brassica* spp.), variety improvement, spraying, cultivation, pollination, harvesting, drying and threshing. Tables are given showing special operations, and the times when they are carried out, for a number of biennial vegetables, annual vegetables and ornamentals.

1204. TOOLE, E. H., TOOLE, V. K., AND GORMAN, E. A.

Vegetable-seed storage as affected by temperature and relative humidity.

Tech. Bull. U.S. Dep. Agric. 972, 1948, pp. 24, bibl. 9, illus.

This study is an extension of the experiments described in *Tech. Bull.* 708 [*H.A.*, 10: 1035] in which the rate of deterioration of vegetable seeds at high temperatures and humidities was determined. In the present paper, seed moisture and germination at different temperatures and humidities is determined for 15 kinds of seed—bean, cabbage, carrot, celery, sweet corn, cucumber, lettuce, okra, onion, pea, pepper, spinach, tomato, turnip and watermelon. None of the seeds had decreased significantly in germination at 50° F. and 50% humidity by the end of 36 weeks. All, however, showed some loss of viability, and nearly all

complete loss, at 80° F. and 80% humidity after 36 weeks. It was found that the effect of temperature and humidity was additive, and the two factors had to be considered together. Tomato proved to be the most resistant to unfavourable storage conditions, and onion the most sensitive. Seeds stored in sealed containers generally kept their viability as well or better than seeds exposed to the air. A chart is given to show the approximate time the seeds remained in storage in various conditions before germination fell below the minimum standards for vegetable seeds.—Bureau of Plant Industry, Beltsville, Md.

1205. RUTZ, J.

Warum Erdtöpfe? (The use and manufacture of soil pots.)

Gärtnermeister, 1948, 51: 381-2.

A small Swiss hand machine is described and illustrated which presses a specified mixture of soil, compost and dung into the form of a pot at the rate of 1,200 per hour, for the raising of vegetable and ornamental plants.

1206. LANGENBUCH, R.

Schädlinge und Krankheiten der Gemüsepflanzen. (Pests and diseases of vegetables.)

Reprinted from *Kampf den Gartenschädlingen*, Berlin, 1948 (?), pp. 10, illus.

Notes on the pests and diseases (with control measures) of cucumber, beans, peas, cabbage, horseradish, carrot, lettuce, celery, asparagus, spinach, tomato, and onion. Two pages deal with more general pests, i.e. aphids, wireworms, cockroach, cut-worms, moles, slugs and snails, and the black water rat. The symptoms of the types of damage caused are summarized in a table.

1207. TUCKER, C. M.

Controlling plant diseases in the home garden.

Circ. Mo. agric. Exp. Stat. 329, 1948, pp. 8.

These general instructions for gardeners include a table showing the treatments desirable for different kinds of vegetable seeds, and notes on resistant varieties.

1208. WADE, G. C.

Is lime of value in controlling plant disease?

Tasm. J. Agric., 1949, 20: 45-7.

After discussing the application of lime to soils for controlling plant diseases, the author sums up as follows: "Its use will reduce losses from clubroot of crucifers and whiptail of cauliflowers, though the latter trouble is more effectively controlled by a molybdenum salt, and it will reduce manganese poisoning in acid soils. On the other hand it will make common scab of potatoes and take-all of wheat worse, and in certain soils will bring about deficiencies of minor elements."

1209. DALE, W. T.

Observations on a virus disease of certain crucifers in Trinidad.

Ann. appl. Biol., 1948, 35: 598-604, bibl. 19, illus.

A virus disease of certain brassica crops in Trinidad is described. Cabbage, cauliflower, kohlrabi and European radish seem to be immune. The virus, which is transmitted by *Rhopalosiphum pseudobrassicae* (Davis), has affinity with some others affecting the crucifers

but is considered to be distinct.—Imp. Coll. of Trop. Agric., Trinidad.

1210. MCKEEN, C. D.

Soil treatment with Arasan for the control of damping off of certain vegetables.

Abstr. in *Phytopathology*, 1949, 39: 15.

Arasan proved to be very effective in controlling damping off in peppers, tomatoes, spinach and cucumber.

1211. PEPPER, B. B.

Vegetable insects and their control on commercial plantings.

Bull. N.J. agric. Exp. Stat. 740, 1948, pp. 15.

The bulletin consists mostly of an insect control chart listing, in parallel columns, (1) crop and insect, (2) kind of injury, (3) description of injurious stage of insect, (4) control or prevention. Twenty-four formulae for the preparation of satisfactory insecticidal mixtures are given.

1212. CHULSKI, K.

The effect of benzene-hexachloride on some crops grown on various soil types.

Quart. Bull. Mich. agric. Exp. Stat., 1948, 31: 170-7, bibl. 4.

The effect of benzene-hexachloride, applied as a soil insecticide, on germination, growth and flavour of sweet corn, wax beans, cucumbers and radishes was studied on soils of different texture and pH. Applications with a 5% wettable dust containing 10-12% of the gamma isomer were made at the rates of 800, 400, 200 and 100 lb. per acre. Sweet corn: On light- and heavy-textured soils dosages of 100 and 200 lb. respectively did not cause any toxic symptoms in the hybrid variety Golden Cross, 800 lb. being definitely and intermediate dosages potentially harmful. Wax bean: The maximum amount can be applied to Pencil Pod without deleterious effect. Cucumber: On sandy soils low in organic matter 400 lb. may be injurious to Boston Pickling, while this amount can be safely applied to heavy-textured soils. Radishes: On light-textured soils applications in excess of 100 lb. gave a characteristic off-taste and smell to Early Scarlet Globe, while a dosage of 800 lb. was safe on heavy-textured soils. The soil treatment stimulated growth, vigour and colour development in all crops on all soils in varying degrees. Applications were found to have a residual effect on the next crop in the rotation.

1213. SUN, Y.-P., RAWLINS, W. A., AND NORTON, L. B.

Comparative toxicity of chlordan, DDT, benzene hexachloride and chlorinated camphene.

J. econ. Ent., 1948, 41: 91-7, bibl. 20.

Laboratory, greenhouse and field tests were made at Cornell University to compare the effectiveness of chlordan with that of DDT, benzene hexachloride and chlorinated camphene for control of the following insects: Colorado beetle, potato flea beetle, striped flea beetle, red-legged grasshopper, cricket, tarnished plant bug, southern army worm, bean aphid, potato aphid, green peach aphid, onion thrips, Mexican bean beetle, spotted cucumber beetle, melon aphid, green-house white fly, the small cabbage white larva, cabbage maggot, and cabbage looper.

Garden vegetables.

(See also 750, 752, 753, 765, 768, 771, 774, 777, 779-784, 800-804, 807, 1001, 1648.)

1214. FERGUSON, W.

Vegetable growing.

Publ. Canada Dep. Agric. 816, 1948, pp. 55, being *Fmr's Bull.* 154.

The cultivation of 36 vegetables for fresh consumption and for canning in Canadian farm gardens is discussed.

1215. DAS, B. K.

Cultivation of European vegetables in Digboi [North-east Assam].

Indian Fmg., 1948, 9: 501-7.

An account of wartime experience, including a description of the methods employed and the difficulties met. Information is given on varieties grown, seed rates, times of planting, spacing, manuring, etc.

1216. NOURI, O.

Hints to vegetable growers [in Cyprus].

Leaf. (Educ. Ser.) Cyprus Dep. Agric. 24, 1948, pp. 18, illus.

Covers essential requirements and the cultivation of vegetables commonly grown in Mediterranean countries. Hints on strawberry growing are included. Tables show when and how to plant and harvest in lowlands and uplands. A dozen pot-herbs are listed with instructions for growing and using them.

1217. HORTUS.

Nouvelles variétés de légumes. (New vegetable varieties.)

Rev. hort. suisse, 1949, 22: 74-80.

Description and illustrations of interesting new vegetable varieties bred in Switzerland.

1218. LARUE, P.

Asparagiculture expérimentale. (Experiments in asparagus growing.)

Rev. hort. Paris, 1948, 120: 312-13.

A brief account of some of the results obtained in America during the last 15 years from experiments on problems of asparagus growing, including distance of planting, size of crown, and period of cutting.

1219. WEINTRAUB, R. L., AND BROWN, J. W.

Translocation of exogenous growth-regulators in the bean seedling.

Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 813.

Evidence is presented in support of the theory that transport of growth regulators from the leaf to the stem of bean seedlings is associated with translocation of organic food materials.

1220. GROGAN, R. G., AND WALKER, J. C.

A pod-distorting strain of the yellow mosaic virus of bean.

J. agric. Res., 1948, 77: 301-14, bibl. 15, illus.

A pod-distorting virus of bean (*Phaseolus vulgaris*) plants is closely related to bean virus 1 and bean virus 2. It is thought to be a strain of bean virus 2.—Wisconsin Agricultural Experiment Station.

1221. GROGAN, R. G., AND WALKER, J. C.

The relation of common mosaic to black root of bean.

J. agric. Res., 1948, 77: 315-31, bibl. 19, illus.

Varieties of bean (*Phaseolus vulgaris*) with the Corbett Refuge type of resistance previously reported as immune from the common mosaic strain of bean virus 1 developed a systemic necrosis and died when infected with this virus and two of its strains, with symptoms of the black root disease. Varieties which have the Robust type of resistance did not develop black root.—Wisconsin Agricultural Experiment Station.

1222. DIMOND, A. E., AND STODDARD, E. M.

Combating bean blight chemotherapeutically with benzoic acid and the salicylates.

Abstr. in *Phytopathology*, 1949, 39: 6.

Systemic infections of *Xanthomonas phaseoli* on red kidney beans may be reduced significantly in incidence and severity through chemotherapeutic treatments with aqueous solutions of salicylates and benzoic acid at non-phytotoxic concentrations.

1223. FELBER, I. M., AND HAMNER, C. L.

Control of mildew on bean plants by means of an antibiotic.

Bot. Gaz., 1948, 110: 324-5, bibl. 3.

The antibiotic actidione, derived from *Streptomyces griseus*, was found to inhibit the growth of mildew (*Erysiphe polygoni*) on beans. The most satisfactory formulation seemed to be an aqueous dispersion of 0.25% methylcellulose to which is added 5 p.p.m. actidione. At more than 100 p.p.m. actidione proved toxic to bean plants, but no harmful effect was observed at 10 p.p.m. The use of an antibiotic as highly active in such minute amounts as actidione may now make it possible to apply a fungicide in the form of an aerosol. Preliminary tests indicate that actidione is non-toxic to animals.—Michigan State College, East Lansing.

1224. DITMAN, L. P., AND CORY, E. N.

Liquefied gas aerosols to control bean beetles.

J. econ. Ent., 1948, 41: 268-75, bibl. 1, illus.

A simple dispenser designed for the application of liquid gas aerosols is described. It is light enough to be attached to a row crop cultivator, and the authors suggest that, if cultivation and insect control were thus combined, greater efficiency and a saving of labour could be achieved. Satisfactory aerosol solutions of DDT, and derris and cubé extracts are suggested, that would not cause stoppage in the line or nozzle. Experiments to determine the minimum effective concentrations and rates of application of these insecticides for the control of bean leaf beetle and Mexican bean beetle are recorded.—Maryland agric. Exp. Stat.

1225. ALLARD, H. A.

*The ecology of the wild kidney bean, *Phaseolus polystachios* (L.) BSP.*

J. Wash. Acad. Sci., 1947, 37: 306-9, bibl. 11.

The author attempts to summarize existing knowledge of this bean from the eastern U.S.A. under habitat,

photoperiodicity, chromosome number and enemies. The bean appears to have considerable interest, by reason of its various photoperiodic responses, its taxonomic relationships, and its possible usefulness in breeding.

1226. LOSADA SINISTERRA, B.

Efectividad de diferentes mezclas de cal y azufre y de una concentración de DDT en el control del *Empoasca fabae* H., en el frijol. (Lime-sulphur and DDT as a control for potato leaf hopper on red kidney bean in Colombia.)

Notas agron., Palmira, 1948, 1: 6-14, bibl. 2, illus.

The effectiveness of 5% DDT dust is compared with that of 4 lime-sulphur dust mixtures (60-40, 50-50, 40-60, 20-80) for control of potato leaf hopper. DDT is shown to give by far the best control, the effectiveness of lime-sulphur decreasing with the decrease in lime content. The use of power dusters is suggested as cheaper and more efficient on the flat lands of the Cauca river valley than the traditional hand dusting method.

1227. HUCKETT, H. C.

Control of the two-spotted spider mite on lima beans, on Long Island.

J. econ. Ent., 1948, 41: 202-6, bibl. 7.

In field trials at Riverhead, N.Y., several synthetic organic compounds were tested as controls for *Tetranychus bimaculatus* on lima beans; the effect on other pests of the bean, especially the bean aphid and Mexican bean beetle, was also noted. The results indicated that hexaethyl tetraphosphate, parathion, and azo-benzene are the most effective control substances for the mite, the first two also giving some control of aphid and beetle. Sulphur treatment proved ineffective.

1228. HINTZE, S.

Tidighetsförsök med rödbeta. (Earliness in beetroot varieties.) [English summary ½ p.]

Reprinted from *Årsskr. Lantbr. Trädgårdsl. Inst.*, 1948, pp. 347-66, bibl. 2, as *Medd. Trädgårdsförs. Malmö* 50.

In comparative trials, carried out for several years at two localities, high-quality round varieties were as early as the inferior, turnip-rooted Egyptian types, but the latter had a much lower percentage of bolting plants and gave higher yields.

1229. BANGA, O.

Verschillen in schiet-neiging bij verschillende rassen en selecties van platte of ronde kroten. (Differences in bolting tendency of different varieties and strains of red table beets.) [English summary ½ p.]

Meded. Dir. Tuinb., 1948, 11: 724-8.

Differences in susceptibility to bolting in early plantings of red table beets are due to differences not in the basic varieties but in the strains. All the strains of Flat Egyptian investigated showed little susceptibility to bolting. The highest susceptibility was found in strains of the old types of Crimson Globe. Bolting is influenced by temperature and length of day. In certain trials sowing in March or the beginning of April resulted in more bolting than sowing in the second half of April or in May.

1230. PLANTENZIEKTEKUNDIGE DIENST, WAGEN-INGEN.

Bestrijding van de vergelingsziekte in bieten.

(Control of beetroot yellows.)

Ber. PlZiekt. Dienst 797, 1949, p. 1.

The beet yellows aphid vectors [? *Myzus persicae* and *Aphis rumicis*] pass the winter on the stored roots. It is advised, therefore, that all storage pits or cellars should be cleared out by 1 April, and that all beetroot refuse should be buried, ploughed under, or the compost heap covered with manure.

1231. MCGUGAN, J. M.

Seeds and seedlings of the genus *Brassica*.

Canad. J. Res., 1948, 26, Sec. C., pp. 520-87, bibl. 66, illus.

The characterization of distinctive features is carried so far that the author can claim it is possible to distinguish the seeds and seedlings of *Brassica* plants "so closely related as to be separated in adult form only by differences in the depth of yellow colour in their roots and blossoms". The identification of species and sub-species is based chiefly on the seed coat, the pigmentation of seeds and seedlings and on shape. A detailed description of varietal forms is followed by two keys for the identification of both seeds and seedlings. The 66 drawings appended are a further material help.—University of Toronto and Dep. of Agriculture, Ottawa.

1232. STATENS FORSØGSVIRKSOMHED I PLANTE-KULTUR.

Stammeforsøg med Vinter-Rosenkaal 1944-1946. (Trials with winter varieties of brussels sprouts 1944-1946.)

Dansk Havebr., 1949, 8: 8, being *Meddel. Statens Forsøgsvirks. Plantekult.* 416.

As usual, the trials were carried out at 4 Danish research stations on different soils.

1233. MILLER, L. W.

Insect pests of cabbages, cauliflowers, and related plants.

Tasm. J. Agric., 1949, 20: 12-16, bibl. 1.

In Tasmania three important pests of cabbages, cauliflowers and related plants are the cabbage aphid, *Brevicoryne brassicae*, and two species of cabbage caterpillars, viz. those of cabbage moth, or diamond back moth, *Plutella maculipennis*, and of the cabbage butterfly *Pieris rapae*. Usually all three are present simultaneously. Their life histories are outlined. Control measures recommended are DDT and benzene hexachloride dusts against the caterpillars. If benzene hexachloride is used throughout the season it will prevent serious aphid infestations.

1234. VOLK, G. M., BELL, C. E., AND McCUBBIN, E. N.

The significance and maintenance of nitrate nitrogen in Bladen fine sandy loam in the production of cabbage.

Bull. Fla agric. Exp. Stat. 430, 1947, pp. 22, bibl. 12 [received 1949].

The nitrate nitrogen in Bladen fine sandy loam was determined periodically following fertilization of cabbage with various combinations of drill applications with and without side-dressings. A general

positive correlation between nitrate nitrogen in the soil just prior to harvest and the yield of marketable cabbage was found. The critical point in nitrate content of the soil at this time was approximately 15 lb. of nitrate nitrogen per acre. Above this value the response to larger amounts of nitrate dropped rapidly. The use of nitrate side-dressings is indicated when the soil nitrate nitrogen drops below 15 lb. of nitrate nitrogen per acre. Nitrate nitrogen as the source of nitrogen in the drill application will maintain the highest level of nitrates in Bladen fine sandy loam during the growing season under average conditions. [From authors' summary.]

1235. HALLSWORTH, E. G., AND LEWIS, V. M.
Ascorbic acid in cabbages.

Emp. J. exp. Agric., 1949, 17: 28-36, bibl. 6.

A study of the effect of certain factors on the ascorbic acid content of cabbages, and of its distribution within an individual head.

1236. WALKER, J. C.
Diseases of cabbage and related plants.

Fmr's Bull. U.S. Dep. Agric. 1439, 1948, pp. 38, illus.

An account of parasitic, non-parasitic and transit and storage diseases of the cabbage. Control measures include (1) rotation, omitting other crucifers, (2) the suppression of mustard and related weeds which harbour cabbage pests, (3) sanitary measures, (4) raising healthy plants. Soil infested with the clubroot organism should be avoided. Seed should be disinfected to prevent black rot and blackleg. Varieties of cabbage resistant to the yellows disease (*Fusarium oxysporum f. conglutinans*) are available.

1237. D'OLIVEIRA, M. L., AND BORGES, M. L.
Estudo dos virus das Crucíferas. III.
Estípites isoladas de *Brassica oleracea* L.
(Study of crucifer viruses. III. Strains isolated from *Brassica oleracea* L.) [English summary 1 p.]

Agro. lusit., 1945, 7: 317-36, bibl. 14, illus.

[received 1949].

Of 25 virus "cultures" obtained from cabbages, 8 could be distinguished by their reactions in 9 differential hosts.

1238. MILLER, P. W., AND McWHORTER, F. P.
A disease of cabbage and other crucifers due to *Cercospora brassicae*.

Phytopathology, 1948, 38: 893-8, bibl. 26, illus.

The geographical distribution, economic importance and host range of a disease of crucifers caused by the fungus *Cercospora brassicae* (Fautr. et Roum.) Hoehnel are described. Cross inoculations indicate that the fungus attacks cabbage, wild mustard and turnip.—Oregon Agricultural Experiment Station.

1239. EDDINS, A. H.
Control downy mildew of cabbage with Spergon.

Press Bull. Fla agric. Exp. Stat. 633, 1947, pp. 4.

An account of the symptoms and control of cabbage downy mildew (*Peronospora parasitica*). Plants should

be sprayed with Spergon, 4 lb. wettable Spergon in 100 gal. water, or 12% spergon dust should be applied.

1240. DILLS, L. E., AND ODLAND, M. L.
Cabbage maggot insecticidal tests.

J. econ. Ent., 1948, 41: 98-101, bibl. 3.

Twenty-three insecticides were tested in an attempt to find an efficient substitute for mercury compounds in the control of cabbage maggot, *Hylemya brassicae*. Chlordan and benzene hexachloride gave very satisfactory results. A 0.2% benzene hexachloride dust was not toxic to radish foliage, and no taint could be detected on the cabbage when eaten.—Pennsylvania agric. Exp. Stat.

1241. CROWELL, H. H., AND OTHERS.

Cabbage maggot control by the use of benzene hexachloride in the soil.

J. econ. Ent., 1948, 41: 362-5, bibl. 8.

The importance of deep and thorough mixing of the toxicant with the soil for control of cabbage maggot (*Hylemya brassicae*) was demonstrated in tests at the Entomology Farm, Corvallis. Benzene hexachloride gave excellent control on radish, broccoli, kohlrabi and mustard, when efficiently applied. Leaf mustard grown on treated plots not only grew more thickly and matured earlier, but gave a considerably heavier seed harvest than the untreated crop.

1242. WARING, E. J., WILSON, R. D., AND SHIRLOW, N. S.

Whiptail of cauliflower. Control by the use of ammonium molybdate and sodium molybdate.

Agric. Gaz. N.S.W., 1948, 59: 625-30; 1949, 60: 21-6, bibl. 15, illus.

From experiments and observations carried out during 1947 and 1948 it is concluded that the easiest method of control appears to be to water the plants in the seedbed with a solution of either ammonium molybdate or sodium molybdate one or two weeks before transplanting. It is recommended that each 10 square yards of seedbed should be watered with 1 oz. of pure ammonium molybdate or 3 oz. of crude (43%) sodium molybdate dissolved in about 10 gal. water.

1243. COUTURIER, A.

Biologie de "Baris laticollis" Marsh et moyens de lutte en Alsace. (Biology of the weevil *Baris laticollis* and its control in Alsace.)

Prog. agric. vitic., 1948, 130: 333-5, bibl. 1.

Market gardeners round Colmar lost their crop of cauliflowers in the spring of 1947 owing to a severe attack of weevil (*Baris laticollis*) which mined the stalks and penetrated into the curd. The weevils can be controlled by watering the ground with an emulsion, or suspension with a wettener, containing at least 0.05% DDT. The operation should be repeated until there is no further risk of attack.

1244. ANON.

Selderijziekten. (Celery diseases.)*

Vlugschr. PlZiekt. Dienst 9, 1948, pp. 4.

Symptoms and control measures of the most important diseases of celery and celeriac (e.g. leaf spot, scab and bacterial heart rot) are described.

* See also 1123.

1245. KELBERT, D. G. A.

The performance of new cucumber varieties.

Market Gr. J., 1949, 78: 1: 16-35.

A report on some of the new varieties of cucumber, including those resistant to downy mildew, that have been bred at the Clemson College Truck Experiment Station, S. Carolina, and released for limited trials in Florida.

1246. KAUFMANN, E.

Beiträge zur Keimungsphysiologie von *Cucumis sativus* im Zusammenhang mit dem Wuchsstoffproblem. (The germination physiology of *Cucumis sativus* with special reference to the hormone problem.)

Reprinted from *Planta*, 1943, 33: 516-45, bibl. 40 [received 1949].

The following are some of the results reported: (1) The pulp of the cucumber fruit, the juice, and especially the mucous layer surrounding the seeds contain an alcohol- and ether-soluble substance that inhibits germination. (2) During the formation of the "Stem-organ" (an organ characteristic of some *Cucurbitaceae* that helps to liberate the embryo from the seed coat), which is caused by auxin concentration, the development of the hypocotyl and of the radicle is partly inhibited. (3) So long as the hypocotyl has a positive geotropic reaction, an inhibiting effect is exerted by heteroauxin at concentrations which have a stimulating influence later, when the organ has a negative geotropic reaction.—University Frankfurt a.M.

1247. MININA, E. G., AND KUŠNIRENKO, S. V.

The role of leaves in the sexuality of plants.

[Russian.]

Doklady Akad. Nauk. S.S.R., 1949,

64: 261-4, bibl. 9.

The author discusses the action of CO on plants, particularly with reference to its influence on the sex of flowers in monoecious plants. Its effect at different concentrations on the development of the laminae of cucumber leaves is shown graphically, and results are tabulated of an experiment which shows that by subjecting leaves to the action of CO (2%) the number of pistillate flowers is increased. A hypothesis to explain these results is propounded.

1248. SMITH, P. G.

Powdery mildew resistance in cucumber.

Phytopathology, 1948, 38: 1027-8.

A genetical study of crossing the variety Abundance with Puerto Rico No. 137. The latter is resistant to powdery mildew (*Erysiphe cichoracearum*), the former very susceptible. In the F₂ generation 5 plants out of 110 approached the resistant parent in degree of resistance.—University of California.

1249. DU TOIT, J. J.

Powdery mildew on cucurbits.

Fmg S. Afr., 1948, 23: 815-16.

This disease is responsible for considerable annual losses to cucurbit crops in the W. and S.W. Cape Province of S. Africa. Symptoms are described and dusting with sulphur recommended. The plants should be dusted as soon as the first symptoms appear and again at intervals of 8, 14, 14-21, and 21 days; the last dose should be given only if the disease is still prevalent. A dusting machine with a fine adjustment

should be used and the minimum dose given, since cucurbits are sensitive to sulphur in varying degree.

1250. ANDERSON, L. D., AND HOFMASTER, R. N.

Control of pickleworms on cucumbers and cantaloupes.

J. econ. Ent., 1948, 41: 334-5, bibl. 1.

The pickleworm (*Diaphania nitidalis*) is now a limiting factor in the production of late cantaloupes and cucumbers in the Norfolk area. Tests made at the Virginia Truck Exp. Stat. indicate that excellent control could be obtained by 1% or 3% DDT or 5% DDD dusts. Two or three applications are needed, starting when the fruit sets. Benzene hexachloride (0.5 and 1.0% gamma isomer dusts) also gave good control, but caused damage to the cucumber leaves.

1251. LA RUE, C. D.

Risers on horseradish roots.

Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 795.

When the horseradish root is severed 6 inches below ground level, "risers", or vertical rhizomes, are formed which grow to the surface and produce a leaf crown there. "The formation of such structures on a plant which normally does not produce any elongated vegetative stem presents an interesting method by which a deeply buried plant may bring its leaves to the surface."

1252. WILSON, R. D.

Some responses of lettuce to the application of molybdenum.

J. Aust. Inst. agric. Sci., 1948, 14: 180-7, bibl. 13, illus.

Further evidence is offered concerning the response of lettuce to molybdenum, more particularly to show that molybdenum apparently acts as a catalyst in the reduction processes of the plant. The results also demonstrate a field response to molybdenum.

1253. WEINTRAUB, R. L.

Influence of light on chemical inhibition of lettuce seed germination.

Smithsonian Misc. Coll., 1948, 107: 20: 1-8, bibl. 19.

It has been proposed that coumarin may be the endogenous germination inhibitor responsible for light-sensitivity of lettuce seed, on the basis of the finding that the inhibitory action of this substance is greater in darkness than in light. This paper shows that the effect is not specific for coumarin. Twenty other named compounds are shown to act similarly. [From author's summary.]

1254. ASHDOWN, D., AND WATKINS, T. C.

Control of lettuce yellows disease in New York.

J. econ. Ent., 1948, 41: 252-8, bibl. 4.

The control of lettuce yellows in New York is directly related to the control of the virus carrier, *Macrosteles divisus*. It is important that the plants should be protected from this leaf hopper from the time of emergence until 3 weeks before harvest. On the results of their experiments at Cornell University, the authors give a commercial recommendation that the

lettuce should be dusted during this period with 5% DDT dust at 35 lb. per acre at 5-day intervals. The spread of the leaf hopper to neighbouring crops is reduced if the fields are dusted between harvesting and discing. A cropping, so planned that younger lettuce beds, still being dusted, are adjacent to the mature crop, will also check migration.

1255. GIDDINGS, N. J.

Curly top of muskmelon.

Phytopathology, 1948, 38: 934-6, bibl. 1, illus.

The curly-top virus may induce severe injury in commercial plantings of muskmelons, and serious losses were reported from certain areas in California and Arizona. Greenhouse experiments suggest the possibility of selecting and breeding muskmelons for resistance to this disease.—U.S. Dep. Agric.

1256. BARGER, W. R., AND OTHERS.

A comparison of fungicidal treatments for the control of decay in California cantaloupes.

Phytopathology, 1948, 38: 1019-24.

Three treatments that showed most promise in the control of decay (chiefly caused by *Rhizopus* and *Cladosporium*) of cantaloupes were sodium borate and sodium hypochlorite washes and nitrogen trichloride fumigation.—U.S. Department of Agriculture, Fresno, California.

1257. CHRISTIAN, R. L.

Missouri Queen watermelon wilt resistant.

Market Gr. J., 1949, 78: 2: 8, illus.

A note on the new variety of watermelon, resistant to *Fusarium* wilt, that was bred by the University of Missouri. It will be available to commercial growers this year for the first time.

1258. KODANI, M.

Sodium ribose nucleate and mitosis.

J. Hered., 1948, 39: 327-35, bibl. 12, illus.

A report of an investigation into the change of morphology and mitotic behaviour induced in the chromosomes of an onion root tip by treatment with ribose nucleic acid.

1259. BLASSINSKY, J.

Gedarrte Steckzwiebeln bringen höhere und bessere Ernten! (Higher yields of better quality from kilned onion sets.)

Ceres, Hamburg, 1948, 1: 10: 5-6.

Onion sets were kept at an air temperature of 20-25° C. from the beginning of January to the time of planting, i.e. for about 10-12 weeks. The data obtained in trials with a number of varieties show that this storage treatment has a beneficial effect in several respects: (1) it prevents bolting in large sets, thereby increasing yields considerably; (2) it stimulates growth in small sets, thereby increasing yields; (3) it reduces storage losses in the onions harvested from the sets; and (4) it increases the essential oil content in these bulbs.

1260. LUBATTI, O. F., RUSSELL, J., AND PORTER, J. S.

Fumigation of agricultural products. I.

A fumigation chamber for onion seeds.

J. Soc. chem. Ind. Lond., 1948, 67: 309-13, bibl. 6.

An illustrated description is given of a fumigation

chamber designed to treat onion seed with methyl bromide. Dosage tables have been worked out for a 24-hour treatment of varying loads of seed, ranging from 10 lb. or less to 110 lb., at 5 moisture levels.—Imperial College Field Station, Silwood Park, Sunninghill, Berks.

1261. CLARK, B. E.

Nature and causes of abnormalities in onion seed germination.

Mem. Cornell agric. Exp. Stat. 282, 1948, pp. 27, bibl. 34, illus.

"The purpose of this study was to investigate the abnormalities of onion seedlings in 3 relationships. First, an attempt was made to discover the effect of seed storage conditions upon the occurrence of seedling abnormalities. Second, morphological observations were made to determine the structural differences between normal and abnormal seedlings. Finally, attention was given to physiological aspects of germination deficiencies." A very extensive series of investigations leads the author to suggest that root elongation and knee formation of the cotyledon may be controlled by growth substances, the production or transport of which is prevented by light. Results of the storage experiments indicate that only a few days of exposure to high temperature and humidity, such as might occur during harvest or while seeds are in transit, cause a significant loss of vitality in the seeds.

1262. EKSTRAND, H.

En för Sverige ny svampsjukdom på importerad matlök. (The first record of a fungus disease of imported onions in Sweden.)

Växtskyddsnotiser, 1949, 4: pp. 63-4.

A rot of onions is described, the causative agent being identified as *Aspergillus alliaceus*.

1263. NELSON, R.

Comparison of dust fungicides and formaldehyde in the control of onion smut.

Abstr. in *Phytopathology*, 1949, 39: 16.

Experiments showed the superiority of the liquid treatments in the control of onion smut (*Urocystis cepulae*) in heavily infested soil. Satisfactory control was obtained in moderately infested soil with Arasan at the rate of 1 lb. to 4 lb. of seed mixed in the drill.

1264. LUBATTI, O. F., AND SMITH, B.

Determination of fumigants. XIX. Sorption of methyl bromide by onion seed.

J. Soc. chem. Ind. Lond., 1948, 67: 296-309, bibl. 36.

The finding that eelworm infestation of onion seed can be controlled by fumigation made it desirable to study the sorption of the fumigant by the seed. The authors make the following recommendations based on detailed experiments: between 10° C. and 15° C. onion seed of 13% moisture content may be safely fumigated with methyl bromide at a dosage giving a concentration-time product of 780 mg. per litre hr. over a period of 24 hours. This range represents the temperatures that might be met in this country in the autumn and winter when fumigation of onion seed would probably be carried out. At the same dosage and at temperatures in the region of 20° C. the moisture content should be 12% or less, and at temperatures near 30° C., 11% or

less. It is probable, however, that at these higher temperatures, likely to occur in warmer countries, the dosage might safely be decreased owing to an increase of the toxicity of the fumigant to the parasite under these conditions. This should be confirmed by toxicity tests on the eelworm, *Anguillulina dipsaci*, at the temperatures in question. It is possible that seed may be damaged by fumigation in such a way as not to affect germination. The effect on stand and yield has not been studied. Other factors which may be of importance are: age of the seed, and the intervals between harvesting and fumigation and sowing.—Imperial College Field Station, Silwood Park, Sunninghill, Berks.

1265. ASHDOWN, D., AND WATKINS, T. C.
Field studies on control of onion thrips in New York.

J. econ. Ent., 1948, 41: 378-82, bibl. 8.

The most effective control programme for onion thrips was found to be one in which paired applications of 5% DDT dust were given, with an interval of 5-6 days to allow for egg hatching and re-distribution of adults. No benefit was derived from dusting before the thrips population had reached an average of 6 per plant. The possibility of aerosol application is investigated for use on the muck soils of New York, where light equipment is essential.—Cornell University.

1266. SELL, H. M., TAYLOR, B. M., AND LUCAS, E. H.

An improved method for the preparation of the antibacterial oil from *Allium sativum* L.
Quart. Bull. Mich. agric. Exp. Stat., 1948, 31: 65-70, bibl. 18.

The water-soluble garlic oil prepared by the improved method has strong antibiotic properties.

1267. TREMBLAY, F. T., AND BAUR, K. E.
A method of determining the potassium requirements of peas.
J. Amer. Soc. Agron., 1948, 40: 945-95, bibl. 8, illus.

In an attempt to develop a more rapid method of diagnosing the fertilizer requirements of plants, experiments were made in western Washington to determine whether, at any particular time during the growing season, any specific part of the pea plant would accurately reflect the potassium status of the soil. It was found that either leaf blades or petioles, selected at the third node from the top of the plant when it had reached an 8- or 9-node stage, gave the best indication of soil potash status. "Tentative limits have been set on the estimated percentage of potassium required in leaves from time of pre-bloom to full bloom stage in order to delineate deficient, low, sufficient, and high potassium areas."—State College of Washington.

1268. TOH, J. S., AND CHEN, S. L.
The effect of seed disinfection on the germination and growth of peas, *Pisum sativum* L. [Chinese, English summary 1 p.]

Fukien agric. J., 1947, 9: 44-51, bibl. 16.

The best results were obtained from seeds treated with Sperton: these showed good germination and growth.

Treatment with black copper oxide appeared promising. [From English summary.]

1269. ANDERSON, L. D., AND HOFMASTER, R. N.
Pea aphid control experiments in Virginia in 1947.

J. econ. Ent., 1948, 41: 278-82, bibl. 1.

The efficiency of various insecticides and various methods of application for control of pea aphid are compared, in experiments recorded from the Virginia Truck Exp. Stat., Norfolk. DDT oil dusts gave better control than simple dusts, but applications of simple dusts by aeroplane gave good results. Benzene hexachloride, as a dust and in aerosol form, was satisfactory, but 1% rotenone and 0.25% parathion dusts, and HETP and piperonyl cyclohexanone pyrethrum sprays were ineffective. HETP, however, gave fair control in aerosol form; chlordan and chlorinated camphene in this form gave poor results. Benzene hexachloride tended to cause damage to foliage, when used as a spray or aerosol.

1270. KENDRICK, J. B., JR., AND MIDDLETON, J. T.
A disease index for *Verticillium* wilt of pepper.

Abstr. in Phytopathology, 1948, 38: 915.

Seedlings of *Capsicum frutescens* L. infected with *Verticillium albo-atrum* have a characteristic stunting which may be classified and analysed statistically. A disease index is obtained by comparing the individual length of an infected plant with the mean length of non-infected plants.

1271. CALDEIRA, J. J. P.

Alguns subsídios para o estudo do pimenteiro cultivado com fins industriais. (Aids to a study of pimenta cultivated for industrial use.)

Rev. agron. Lisboa, 1945, 23: 274-8 [received 1949].

A study of the characters and yields of 20 forms of pimenta [*Pimenta officinalis*] in Portugal.

1272. SEVERIN, H. H. P.

Additional virus diseases of spinach in California.

Hilgardia, 1948, 18: 553-8, bibl. 14, illus.

Spinach (*Spinacia oleracea*) was shown to be naturally infected in California with sugar-beet mosaic and two cucumber mosaics, namely western cucumber mosaic and celery calico. Nine varieties of spinach were experimentally infected with the two cucumber mosaic viruses, five with sugar-beet mosaic. The symptoms of these three diseases on spinach are similar. New Zealand spinach (*Tetragonia expansa*) was experimentally infected with western cucumber mosaic. The green peach aphid, *Myzus persicae*, is the most important vector under natural conditions. [From author's summary.]

1273. CARRUTH, L. A., AND HOWE, W. L.

Factors affecting use and phytotoxicity of DDT and other insecticides for squash borer control.

J. econ. Ent., 1948, 41: 352-5, bibl. 2, illus.

The injury caused by the use of technical grade DDT on cucurbits can be eliminated by using a grade with a higher setting point (103-105° C.). Of the other insecticides tested for the control of squash borer

(*Melittia cucurbitae*), only 1% rotenone, 5% chlordan and 1-2% parathion were found sufficiently harmless to foliage to justify use. The varietal differences in susceptibility to borer attack and insecticide injury were studied in 3 species of squash.—New York State agric. Exp. Stat., Geneva.

1274. RICK, C. M.

Genetics and development of nine male-sterile tomato mutants.

Hilgardia, 1948, 18: 599-633, bibl. 23, illus.

Concerns a search made amongst commercial plantings of the San Marzano tomato in California for male-sterile mutants, potentially useful for producing F_1 hybrid seed and in cross-breeding. Among 150 unfruitful plants, 12 were found to be genetically male-sterile.

1275. HOFMEYR, J. D. J., NEL, E. A., AND LOEST, F. C.

A new tomato variety [for S. Africa].

Fmg S. Afr., 1948, 23: 805-8, bibl. 3, illus.

A description of the selection, Hortus 5, developed recently at the Subtropical Horticulture Research Station, Nelspruit, and derived from seed originally supplied in 1940 by Bohn and Tucker of Missouri Exp. Station. Its chief attribute is its relatively high resistance to *Fusarium lycopersici*, a wilt which is probably responsible for most of the annual losses sustained by tomato growers in the S. African lowveld.

1276. ROSS, A. A.

Tomato variety investigations in the Stanthorpe district [Queensland].

Qd agric. J., 1948, 67: 135-42, 200-5, illus.

The annual acreage under tomatoes in the district is approximately 1,500. Average yields of marketable fruit are low, largely because the varieties planted are unsuitable. The crop is grown in summer, without irrigation and unstaked. Local requirements, which demand a smooth, round fruit $2\frac{1}{2}$ to 3 in. in diameter, are specified. Varieties should be resistant to sunburn and the common leaf diseases. Trials have shown that the varieties Sioux (early), Grosse Lisse (mid-season) and Rutgers and Valiant (both late) are well adapted to Stanthorpe conditions, their fruit being of excellent quality and their crops consistently heavy.

1277. LEWIS, D. C.

Identifying rogue tomato plants.

Grower, 1949, 31: 244-5, illus.

In Britain the proportion of rogues, jacks, or featherlegs found amongst tomato seedlings varies with the variety from nothing to 20% or more. The character is inherited. In the U.S.A. such rogues are rare. Rogues differ from normal plants in having: very short joints, smaller leaves with fewer segments, early side shoots giving plants a feathery appearance, a sterile first truss and later trusses less productive than normal. It is possible to pick out rogues as soon as the first true leaf appears. At this stage the rogue has two equally developed, short leaves, each with three lobes about equal in size, whereas a normal seedling has one well-developed leaf which is long and narrow with one large lobe at the tip and two or three minute segments near the stalk. There are other more subtle differences. High temperatures during germination have a profound effect on the proportion of rogues. Seed should be

germinated at a low temperature and not at the high temperature of a cucumber house. Another factor influencing the proportion of rogues is the truss from which seed is obtained. Avoid seed from third and fourth trusses of those varieties which sport rogues.

1278. ALEXANDER, L. J.

A new glasshouse tomato variety, of Globe type, resistant to *Fusarium oxysporum f. lycopersici* race 1.

Abstr. in *Phytopathology*, 1949, 39: 1.

This new tomato variety, Ohio Wilt Resistant Globe, resulted from crossing a resistant form with Globe and backcrossing twice to Globe. Its vine characters closely resemble those of Globe, but the fruits tend to be slightly flatter and smaller.

1279. GEORGIEVA, R.

Variation of vegetative hybrids in certain Solanaceae. [Bulgarian, Russian and French summary.]

Sci. Publ. centr. agric. Res. Control Inst. Sofia, 1947, 1: 1: 1-41, bibl. 21, illus.

An account is given of the results of grafting together tomato varieties with different characters (e.g. form, size, and colour of fruit) and also of the intergeneric grafting of tomato on capsicum. It is stated that the nutritional change induced by grafting alters the hereditary qualities of the plant, and in the F_1 generation may give rise to modifications characteristic of hybrids. Such modifications of hybrid characters in F_1 can be obtained when there is a difference of age in the graft components. Manipulation to obtain differences in the amount of foliage in the components is very important in the effect it has on heredity. The component under study is stripped of its leaves so that it receives the full nutritional effect of the foliage of the other component. In intergeneric grafting, tomato on capsicum, the removal of foliage from the scion so that all its nutrient was received from the rootstock had a marked effect in the alteration of its flower parts, dropping of flower buds, and parthenocarpic fruits. Coloured plates show the fruit of the two components in certain tomato graftings and that of the "vegetative hybrid" obtained from grafting them.

1280. ROSS, A. A.

Studies of growth correlations in the tomato.

Bull. Qd Dep. Agric. Stock, Div. Plant Ind. 33, 1946, pp. 36, bibl. 25 [received 1949].

1. An investigation has been made of the correlations existing in Salads Special variety of tomato between dimensions of plant parts which can be readily measured without interfering with plant growth and dry weight of plant, area of individual leaves and fresh weight of fruit. 2. Dry weight of vegetative parts is most conveniently estimated by measuring height and diameter of stem and combining them in the function, height \times mean diameter². 3. Leaf area may be computed by squaring the length of the mid-rib of the compound leaf, or somewhat more accurately by summing the products of lengths and widths of all leaflets. 4. Fresh weight of fruit is given reasonably closely by cube of circumference, but several other functions are also satisfactory. 5. Methods of measurement are given in detail, and tables and monograms are presented for use in converting linear measurements

into values for dry weight, area of leaf, and weight of fruit. [Author's summary.]

1281. MACVICAR, R., AND BURRIS, R. H.
Translocation studies in tomato using ammonium sulphate labelled with N^{15} .
Amer. J. Bot., 1948, 35: 567-70, bibl. 12.

The rate of assimilation and translocation of ammonium nitrogen in the tomato plant was studied at the University of Wisconsin, by means of the radio-active tracer technique.* "The rapid initial increase in the concentration of labelled nitrogen to a maximum in more mature tissues suggests the conversion of the absorbed ammonium ion to organic nitrogenous compounds and the transfer of such compounds to other and more rapidly metabolizing portions of the plant; however, the possibility of direct translocation of ammonium ions and synthesis *in situ* is not excluded as an explanation of the observations." [From authors' summary.]

1282. GALLELY, J. D.
Tomato culture in troughs under glass.
N.Z. J. Agric., 1948, 77: 445-7, illus.

A system of growing tomatoes in troughs under glass has been adopted by many Canterbury growers, some of the advantages being: (1) Disease control is simplified; diseases cannot spread beyond the trough affected. (2) Soil temperatures in troughs 1 ft. above the ground are several degrees higher than that of the soil at ground level. (3) It is considered that heavier crops of early fruit can be obtained by this method than by planting on the floor of the house. (4) The better drainage and warmer soil enable the plants to make a better start and so to increase the chances of a good set. The troughs are described and illustrated.

1283. GILLARD, S. O.
Outdoor tomatoes from December to June [in New Zealand]. Practices followed in Auckland district.
N.Z. J. Agric., 1948, 77: 401-6, illus.

Notes on cultural practices including varieties to grow, fertilizers, the control of diseases and pests, and harvesting.

1284. KASATKIN, A. F.
Growing tomato seedlings on warm soil.
[Russian.]
Sad i ogorod (Orchard and Garden), 1949, No. 2, pp. 61-2.

In order to economize the area under frames for raising early vegetable seedlings, a method of growing tomato seedlings on warm soil has been elaborated by which little or no frame space is required. It is based on acclimatizing the seedlings to rather low temperatures by using seed from plants that have withstood low temperatures through a number of generations. The ground selected should slope towards the south and the soil should be clayey sand which rapidly dries and becomes warm in spring. The preparation of the beds is described, and precautions to be taken to protect them in cold weather are indicated. The seed may be sown in a warm frame and about 3 weeks later the seedlings transplanted to the prepared warm beds, or the seed may be sown direct in the beds. Watering the beds with warm water previous to sowing is recommended.

* See also 739-741.

1285. ANON.

Winning en ontsmetting van tomatenzaad.
(Saving and disinfecting tomato seed.)
Meded. Rijksstuinbcons. Z.H. Glasd., 1948, 13: 55-6.

Practical details are given of the new heat treatments of tomato seed for the control of *Verticillium dahliae* and *Didymella lycopersici*. Treatment at the seed nursery is preferable, for there dry heat may be used during the process of extraction, and the seed can be stored quite satisfactorily afterwards. After extraction with hydrochloric acid the seed is dried in a current of warm air at 42-43° C. for several hours. This is found to give complete disinfection. If treatment is left to the market grower, however, hot water treatment must be used, after which the seed will not store. This consists of dipping the seed in a water bath at 45°-50° C. for half an hour immediately before sowing.

1286. PASZEWSKI, A., AND KASZEWSKA, W.
Wyniki doswiadczeń polowych nad obrączkowaniem i nacinaniem pomidorów. (The results of field experiments on the ringing of tomato plants.) [Polish, English summary.]
Ann. Univ. Mariae Curie-Skłodowska Lublin, Sect. E, 1947, 2: 29-55,

Ringing either with a loop of iron or by removal of a ring of cuticle induces increased cropping in tomatoes, the increase being high in the crop of healthy fruits, and particularly noticeable as the fruit begins to ripen. Loss of crop from disease or unsuitable environment is less in treated than in untreated plants.

1287. CLENDENNING, K. A.
Growth studies of normal and parthenocarpic tomato fruits.
Canad. J. Res., 1948, 26, Sec. C., pp. 507-13, bibl. 16, being *N.R.C. 1844*.

Gaseous exchange by growing tomato fruit is localized in a ring of lenticel tissue that encircles the receptacle and is covered by the calyx. The size of this annular lenticel varies with the size of the fruit. Growth of the fruits of the variety Grand Rapids includes a phase of residual mitotic activity that persists for approximately one week after setting. Cell division is reduced in dwarf or laggard fruits, which are examples of natural parthenocarpy. Under seasonal conditions that are favourable for natural setting, application of 0.2% indolebutyric-50p.p.m. β -naphthoxyacetic acid to pollinated flowers markedly increases the number and size of fruits obtained with the Marglobe but not with the Grand Rapids variety. The locular pulp of parthenocarpic fruits usually remains green during vine ripening. The green colour is largely imparted by chloroplasts that are concentrated in the vicinity of the vascular strands leading to the aborted ovules. [Author's abstract.]—Nat. Res. Laboratories, Ottawa and Ontario agric. College.

1288. WURGLER, W., AND MOTTIER, P.
Le développement parthénocarpique des fruits par des substances de croissance. Application de ce principe pour la culture des tomates en serre. (The application of growth substances to glasshouse tomatoes.)
Rev. hort. suisse, 1949, 22: 33-42, bibl. 7.

A popular discussion of induced parthenocarpy is

followed by experimental data which show that glasshouse tomatoes treated with the potassium salt of 4-chlorophenoxyacetic acid at 50 p.p.m. matured earlier and yielded slightly more than the controls. β -naphthoxyacetic acid was less effective.

1289. BALDONI, R.

Ricerca di induzione di partenocarpia nel pomodoro. (Induced parthenocarpy in the tomato.)

Reprinted from *Humus*, No. 2, Feb. 1948, pp. 3, illus.

A discussion of foreign work is followed by a brief description of trials at Corticella, University of Bologna, in which melons and three varieties of tomato were submitted to treatment with β -naphthoxyacetic acid and its potassic salt both in solution and in powder form. With melon no result was obtained. The results with all three tomato varieties, particularly those from the use of the acid itself at a concentration of 40-60 p.p.m., were entirely satisfactory. Analysis showed that the content of reducing sugars was equal to or greater in the parthenocarpic than in the normal fruits, while the dry matter, thanks to the presence of seeds, was greater in the normal fruits. It is not suggested that the treatment, although successful, could be economically used under northern Italian conditions.

1290. IRVING, G. W., Jr.

The significance of tomatin in plant and animal disease.

J. Wash. Acad. Sci., 1947, 37: 293-6, bibl. 8
[received 1949].

Results are reported from which it is tentatively concluded that wilt-resistance or wilt-susceptibility in the tomato plant does not necessarily depend upon the presence or absence of tomatin, but rather upon the rate at which the plant is able to elaborate tomatin as the need for this protective substance arises. If the metabolic processes of a given tomato variety are capable of producing tomatin at a rate sufficient to maintain a protective level in the plant, then that variety will be resistant to wilt.

1291. OWEN, O.

Tomato nutrition.

Sci. Hort., 1949, 9: 45-9.

The author confines himself mainly to N, P, and K requirements. This paper was read in September 1946.

1292. MIGHTON, C. E., AND OSBORN, J. H.

Fertilizing tomatoes for earliness and quality.

Bett. Crops, 1949, 33: 6-8 and 43-4.

As the processing tomato crop in Ontario is being grown at the northern limit of the climatically suitable area, early ripening is of great importance. The soil temperatures of early summer are not high enough to bring about rapid release of phosphorus, and the use of transplanting solutions with a high phosphorus content is recommended. The placement of phosphates under the rows has also been found to give better and earlier yields than broadcast dressings. The calcium-potassium ratio of most Ontario soils is very high, and heavy dressings of potash (about 180 lb. per acre) are needed to give good yields and high quality.

1293. DORMER, K. J., AND STREET, H. E.

The carbohydrate nutrition of tomato roots.

Ann. Bot. Lond., 1949, 13: 199-217, bibl. 24, illus.

On the results of experiments made at the University of Nottingham, a comparison is made of the growth of excised tomato roots in culture media containing combinations of sucrose, dextrose, yeast and synthetic solutions. It was found that roots supplied with sucrose are thicker, quicker growing, and more abundantly branched than those grown on dextrose, and show a greater anatomical differentiation. Evidence indicates that the roots are able to utilize sucrose at a greater rate than either dextrose or laevulose. A possible method of sucrose utilization is suggested, involving a specific phosphorolysis of sucrose. Both sucrose and dextrose solutions containing yeast extract yield thicker roots than the corresponding solutions containing a synthetic organic supplement. This is put down to the effects of the growth hormone and polyphosphate-P contained in yeast.

1294. HODGSON, R., PETERSON, W. H., AND RIKER, J.

The toxicity of polysaccharides and other large molecules to tomato cuttings.

Phytopathology, 1949, 39: 47-62, bibl. 24, illus.

Various polysaccharides of both plant and microbial origin, in 0.1% to 0.4% aqueous solutions induced wilting in tomato cuttings. Among the polyethylene glycols, Carbowaxes all caused wilting of the leaflets.—University of Wisconsin.

1295. BAILEY, F. L.

Sub-irrigation of glasshouse tomatoes.

N.Z. J. Agric., 1948, 77: 475-6, bibl. 1.

The pipeline system of sub-irrigation is described, with a plan of the pipelines and reservoirs. Its advantages and disadvantages are set out, one advantage being that, since the soil surface and air in the glasshouse are kept drier, fungus diseases, particularly leaf mould (*Cladosporium fulvum*), are largely prevented, or at least, retarded.

1296. ABERDEEN, J. E. C.

Big bud in tomatoes [in Queensland].

Qd agric. J., 1948, 67: 213-14, illus.

The disease is described. To control, reduce outside sources of infection (host plants) and destroy the leaf-hopper carrier within the crop by spraying with 0.1% DDT, or dusting with 2% DDT, repeating the treatment every 10 days while the insect is prevalent.

1297. SMITH, P. G., AND GARDNER, M. W.

Inheritance of spotted wilt resistance in tomato.

Abstr. in *Phytopathology*, 1948, 38: 918.

The Red Currant tomato (*Lycopersicon pimpinellifolium*) shows marked resistance in the field to spotted wilt. German Sugar, a variety of *L. esculentum*, is moderately resistant to field infection. Hybrids of Red Currant and the cultivated tomato show intermediate resistance, and so do the F_1 and F_2 progeny of hybrids of German Sugar and the commercial varieties.

1298. DU TOIT, J. J.

The control of spotted wilt of tomatoes [in S. Africa].

Fmg. S. Afr., 1948, 23: 786-8.

A description of a virus disease, spread mainly by thrips, which causes severe stunting of tomato plants. Results from thrips control experiments at Stellenbosch indicate that there is no significant difference between dusts containing 4% nicotine, 0.5% gammexane, and 5% DDT; but DDT was preferred because it need only be given once every third week. Advice is given on the treatment of tomato plants from seedbed to field.

1299. GALLEGLY, M. E.

Host nutrition and predisposition in relation to development of bacterial wilt of tomato.

Abstr. in *Phytopathology*, 1949, 39: 7.

Development of wilt (*Pseudomonas solanacearum*) in plants grown in sand culture at nutrient concentrations 0.1, 0.5, 1, 2 and 3 times basal during summer months was greatest at 0.1 and decreased with an increase in salt concentration; during late autumn and early spring disease development was greatest at 0.5 and 1.

1300. SUTTON, W. S.

Bacterial spot of tomatoes.

Agric. Gaz. N.S.W., 1948, 59: 595-7, illus.

Bacterial spot of tomatoes (*Xanthomonas vesicatoria*) is becoming a serious disease in certain parts of New South Wales. The first symptoms are small, rather irregular, somewhat greasy-looking areas, which later become slightly raised, dry, greyish-brown spots. These may fuse and cause the death of large sections of the leaf. The flowers and main stems are sometimes attacked. The bacteria are distributed on the seed and two forms of seed treatment have proved useful, viz. a mercuric chloride dip, and hot water treatment. No spray is completely effective, but observations suggest that home-made bordeaux mixture 2-2-40 will check the rate of spread from plant to plant.

1301. PLATTNER, P. A., AND CLAUSON-KAAS, N.

Über Lyco-marasmin, den Welkstoff aus *Fusarium lycopersici* Sacc. (On lyc-o-marasmin, the wilting agent of *Fusarium lycopersici* Sacc.)

Experientia, 1945, 1: 6: 195-6, illus. [received 1949].

A wilt-producing substance, lyc-o-marasmin, has been isolated from cultures of *Fusarium lycopersici*, the cause of tomato wilt.

1302. LOCKE, S. B.

A method for measuring resistance to defoliation diseases in tomato and other *Lycopersicon* species.

Phytopathology, 1948, 38: 937-42, bibl. 21.

A laboratory test for measuring the relative resistance or susceptibility of tomato strains and *Lycopersicon* species to early blight (*Alternaria solani*) and septoria leaf spot (*Septoria lycopersici*) makes use of artificial inoculation into detached leaflets which are then incubated in moist chambers. It has been useful in the discovery of a source of practical resistance to the diseases, and has aided progress toward incorporating genetic factors which control this resistance into

horticulturally superior tomato strains.—University of Arkansas.

1303. WILSON, J. D., AND RUNNELS, H. A.

Tomato anthracnose control in 1948.

Abstr. in *Phytopathology*, 1949, 39: 26.

In trials for the control of tomato anthracnose (*Colletotrichum phomoides*), Zerlate (zinc dimethyl dithiocarbamate) still ranks high. Tests with trellises indicated that keeping the fruits off the soil is more effective in preventing infection than any spray programme.

1304. OSNICKAJA, E. A.

A *Phytophthora* disease of tomatoes under glass. [Russian.]

Sad i ogorod (Orchard and Garden), 1949, No. 2, pp. 62-4.

A disease different from ordinary *Phytophthora* blight has been observed on tomato plants under glass near Moscow. In 1948 on one state farm 60% of the seedlings for autumn culture were affected with this disease. The causal organism is more nearly related to *Phytophthora capsici* than to *P. infestans*. The disease affects not only the fruit but also the vegetative organs of the plant. On the fruit it produces soft pale spots which increase in size and show variously coloured zones. When the lower part of the stem is affected the disease resembles black-leg. The optimum temperature for the fungus is 25°-30° C., and at 10° lower than this it hardly develops at all. It is thus particularly harmful under greenhouse conditions. It has hosts other than solanaceous plants and can infect water-melon, melon, and cucumber, and by artificial inoculation it can cause a rot of apples. Primary infection appears to come from infested soil. Control measures recommended are a change of soil or soil disinfection by chloropicrin, granosan or formalin, and the removal and destruction of affected plants as soon as they are seen. To protect the fruit the plants and the soil should be sprayed with 1% bordeaux mixture. Mulching with straw will prevent splashing the fruit with infested soil when watering.

1305. GALLEGLY, M. E.

Host nutrition in relation to *Verticillium* wilt of tomato.

Abstr. in *Phytopathology*, 1949, 39: 7.

In greenhouse trials with varying concentrations of a balanced solution disease development was least at the 0.1% level and increased with an increase in salt concentration. In an unbalanced solution low in nitrogen, disease development decreased.

1306. CHAPMAN, R. A., AND LINN, M. B.

Mineral nutrition in relation to infection of the tomato by *Septoria lycopersici*.

Abstr. in *Phytopathology*, 1949, 39: 4.

Significant increases in amount of infection were obtained when nitrogen was increased from 21 to 630 p.p.m., and boron from 0.05 to 1.5 p.p.m., but significant decrease in infection when manganese was increased from 0.05 to 1.5 p.p.m. and copper from 0.002 to 0.06 p.p.m.

1307. ENTOMOLOGICAL BRANCH DEPARTMENT OF AGRICULTURE, N.S.W.

The tomato mite (*Vasates destructor*).

Agric. Gaz. N.S.W., 1949, 60: 43-4, illus.

Tomato mites may be controlled with sulphur dusts or sulphur sprays or with a DDT emulsion spray. A general purpose spray for the control of pests and diseases in coastal tomato-growing districts is as follows: DDT emulsion (20%) 16 fluid oz., colloidal sulphur 1 lb., bordeaux mixture (1:1:40 or 1:1:20) 40 gal.

1308. PASFIELD, G.

Use of DDT for thrips on tomatoes in the metropolitan area [N.S.W.]. Effect on incidence of spotted wilt.

Agric. Gaz. N.S.W., 1948, 59: 604-5.

In an experiment described DDT sprays resulted in a lighter infestation of thrips (*Thrips tabaci*) and a significant reduction of infection of spotted wilt.

1309. GILLARD, S. O.

Chemical disinfection of glasshouse soil for tomato crops.

N.Z. J. Agric., 1948, 77: 501, illus.

The results of trials described indicate three promising chemical treatments in place of steam sterilization, viz. chloropicrin (tear gas), Shell DD, and Iscobrome, particularly for the control of eelworm.

1310. NELSON ESTRADA, R., AND FERNANDO VILLAMIL, G.

Experimento de campo sobre el control de nematodos a base de D.D. (Eelworm control by D.D. in Colombia.)

Notas agron. Palmira, 1948, 1: 1-5, bibl. 5.

An account of the field trial that was conducted at the Estación Agrícola Experimental de Palmira, to assess the value of D.D. as a control for the nematode, *Heterodera marioni*. The tomato variety New Pritchard was grown. Significantly more fruit was picked from the plots treated with D.D. at 300 lb. per acre than from the untreated plots, or from those given 100 lb. per acre. The number of plants with eelworm infected roots, however, was not significantly different, whatever the rate of application of D.D. Further trials are recommended.

Potatoes.

(See also 732, 738, 979, 1621, 1622.)

1311. MATTINGLEY, G. H.

The potato crop. Seed, planting and cultivation.

J. Dep. Agric. Vict., 1948, 46: 529-35, illus.

Since the introduction by the Department of Agriculture (Victoria) of the Seed Potato Certification Scheme in 1938, the causes of potato degeneration and disease have become better understood and growers now appreciate the value of good seed and its effect on yield. Cultural operations in relation to conditions in Victoria are described.

1312. MORAES, A. DE M.

Acerca do melhoramento da batateira. Revisão bibliográfica. (Improving the potato. A bibliographical review.)

Rev. agron. Lisboa, 1946, 34: 248-314, bibl. 176 [received 1949].

After a review of work on the factors affecting yield and quality of potatoes, a scheme is drawn up as a

basis for organizing services for improving the production of potatoes in Portugal.

1313. ANON.

Quatre nouvelles variétés françaises de pommes de terre. (Four new French potato varieties.)

Pomme de Terre franç., 1948, 11: 112: 19-21.

A description is given of the four new varieties BF15, Rondine, Préveloise and *Solanum*.

1314. OLDAKER, C. E. W.

Potato variety—Snowflake.

Tasm. J. Agric., 1949, 20: 30-1.

Complaints have been made about the poor quality of Snowflake potatoes from Tasmania on the mainland market, owing to (1) blight infection and tuber break-down and (2) secondary growth resulting in "glassy end". The conditions under which this disorder develops are discussed, and it is concluded that "soils of good quality and capable of retaining moisture to a satisfactory degree should be utilized, and planting carried out only late in the season, or as best dictated by local knowledge of normal rainfall and soil conditions", so as to ensure even growth from early tuberation to final ripening of the plant.

1315. DEMEL, H., AND GRAF, A.

Sortenversuche 1946/1947 der Bundesanstalt für Pflanzenbau und Samenprüfung. (Variety trials 1946/1947 of the Austrian institute for plant culture and seed testing.)

Bodenkultur, 1948, 2: 90-107.

Includes a preliminary communication (pp. 105-7) on trials with Dutch potato varieties.

1316. SALZMANN, R.

Aktuelle Fragen im schweizerischen Kartoffelbau. (Topical questions in Swiss potato growing.)

Reprinted from *Schweiz. landw. Monatsh.*, 1948, H.4, pp. 28, bibl. 12.

(1) Seed potato production: (a) high altitude as such does not guarantee freedom from aphids; (b) early harvesting and haulm destruction; (c) heat treatment of tubers for virus control is not practicable. (2) Marketing. (3) Diseases and pests: (a) wart disease; (b) Colorado beetle. (4) Varieties.

1317. SAUVIGNON.

La sélection. (Seed potato production in France.)

Pomme de Terre franç., 1948, 11: 111: 10-14.

The regulations are set out governing the production of seed potatoes in France.

1318. ANON.

Fédération et Commission de Contrôle. (The supervision and direction of seed potato growing in France.)

Pomme de Terre franç., 1948, 11: 111: 7-10.

The aims are defined which the two French national organizations have undertaken to serve in regulating the country's seed potato production: the Fédération Nationale des Producteurs de Plants de Pomme de Terre, a growers' association, and the Commission Officielle de Contrôle, an organ of the Ministry of Agriculture.

1319. GUZZINI, D.

Patate da seme. (Seed potato production in Italy.)

Ital. agric., 1948, 85: 309-17.

A survey of seed potato production in Italy, showing the early, promising steps taken to provide guarantees of quality, the ruinous effects of the later war years followed by the suppression of the Enti Economici, and recent efforts which have been made to restore the situation by the proposed institution of a national mark and certificate.

1320. BONVICINI, M.

Produzione italiana di patate da seme.

(The production of seed potatoes in Italy.)

Reprinted from *Ann. Accad. Agric. Bologna*, 1944, Vol. 5, pp. 31 [received 1948].

Discussion of trials with Bintje, Majestic, and Bohms varieties of potato in which attempts were made to determine how long these varieties could, without recourse to a new source of seed, be profitably raised in mountain districts of northern Italy with and without careful selection and elimination of disease-affected tubers. Bohms proved the most and Bintje the least amenable to such treatment. Hints are given on the care necessary by those wishing to raise their own seed for use in the plains.

1321. FRIEDRICH, H.

Zur Frage des Kartoffel-Pflanzgutwechsels.

(The exchange of seed potatoes.)

Bodenkultur, 1948, 2: 293-7.

It has been suggested that the exchange of seed potatoes between growers in different areas is beneficial. Trials carried out at Berlin-Dahlem on a fairly large scale and parallel trials on a smaller scale in Pomerania tend to prove the opposite, viz. that a change in locality may reduce yields. In Berlin-Dahlem, for instance, 26 varieties grown 6 years in succession, averaged 48% of the yields obtained in the first year from virus-free seed, as against 40% maximum yield of local varieties transferred to another place having similar environmental conditions. The conclusion is drawn that potato tubers bequeath to their vegetative progeny not only their genetical constitution and their state of virus infection, but also a physiological modification affecting the yield of the daughter generation, at least in the first year. This locality modification which has a pronounced after effect is considered as an adaptation that ceases to function in the case of a change of environment.

1322. HARVEY, P. N.

Early planting of maincrop potatoes: Sprouting experience [Norfolk, England].

Agriculture, 1949, 55: 543-4, bibl. 2.

Results (1948) are quoted which show that varietal characters have an important bearing on the time of planting potatoes, thus Arran Banner did not suffer from late planting to the same extent as Majestic. [See *H.A.*, 19: 444.]

1323. GLASSCOCK, H. H.

Prevention of sprouting in potato clamps.

Gdnrs' Chron., 1949, 125: 54-5, bibl. 4.

The proprietary dust "Fusarex", and the growth-inhibiting substances alpha-naphthaleneacetic-methyl-ester, and methyl-alpha-naphthyl-methyl-ether, were

used in field trials at Wye College, Kent, for the prevention of sprouting in potato clamps. None of the substances was completely successful, although the growth of shoots in the ester-treated clamp was considerably less than in the others. Contrary to the findings of earlier workers, the ether treatment resulted in increased sprout development. Fusarex prevented sprouting in the outer layers of the clamp only, and had a marked fungicidal effect in preventing the normal rotting of the roots which made separation of the tubers very difficult. It is suggested that failure to obtain complete control of sprouting is due to the gradual escape of the growth-inhibiting vapour, and that this might be compensated for by the use of a substance or method of application by which vapour is evolved over a longer period.

1324. MÜNSTER, J.

Une meilleure conservation des pommes de terre de consommation par les hormones. (Hormone treatment for the better storage of ware potatoes.)

Rev. romande Agric. Vitic., 1948, 4: 89-90.

At Lausanne the treatment of potatoes with a proprietary hormone preparation reduced losses from sprouting from 12.5 and 13.8% to 2.1 and 2.7% respectively in two indoor stores.

1325. ZOBRIST, L.

Verhinderung des Auskeimens der Speisekartoffeln. (The prevention of sprouting in stored ware potatoes.)

Gärtnermeister, 1949, 52: 17-18.

The trials reported show that the Swiss phytohormone preparation Germex controls the sprouting of stored potatoes effectively.

1326. FERRO, R. B., AND JONES, H. T.

Manuring the potato crop on wold land [in Yorkshire].

Agriculture, 1949, 56: 32-4, illus.

An article based on the results of manurial trials at Wharram during 1946-48. The striking feature of the results is the highly significant effect of potash on increasing yield. Even in the absence of dressings of superphosphate, 6 cwt. sulphate of ammonia plus 3 cwt. per acre muriate of potash more than doubled the yield; when superphosphate (4 and 8 cwt. per acre) was added and the potash increased to 6 cwt. per acre, a further improvement was obtained up to about 11-12 tons per acre in 1946 and 1947, and 8½ tons in 1948.

1327. KOBLET, R.

Untersuchungen über den Einfluss der Stickstoffdüngung auf den Krankheitsbefall und die Speisequalität der Kartoffel. II. (The influence of nitrogen manuring on disease incidence and eating quality in potatoes. II.) [French summary ½ p.]

Landw. Jb. Schweiz, 1948, 62: 827-47, bibl. 28.

For Part I see *ibidem*, 1947, 61: 665-99; *H.A.*, 18: 1954. The second part deals with the chemical composition of the tubers, which was influenced by the varying amounts of nitrate nitrogen applied in the field in addition to basic applications of stable manure, superphosphate and potassium phosphate. (1) In the

majority of cases additional nitrogen increased the N-content of the tubers, but the effect on total ash, P- and K-content varied greatly in different localities. (2) There was no relationship between N-content and *Phytophthora* rot in properly stored tubers. (3) In the variety Voran, which is susceptible to blackening after cooking, a positive relationship was found to exist between N-content of the tuber and incidence of the trouble and a negative relationship between K-content and blackening. Another variety, which normally does not show any tendency to blackening, remained unaffected by higher N-content. (4) Finally, the need for balanced K and N applications is stressed if good quality is to be achieved. The results also show the importance of K-applications on soils low in available potassium.—Swiss Agricultural Experiment Station, Zürich-Oerlikon.

1328. MONOT, G.

Essais d'engrais sur les pommes de terre.
(Fertilizer trials with potato.)

Pomme de Terre franç., 1949, 12: 113: 28-32.

One year's trials on typical, well-manured potato soils in Brittany led to the conclusion that additional nitrogen applications in the form of 40-60 kg. ammonium sulphate are beneficial.

1329. WILSON, J. H.

Lime responses from potatoes in Tasmania.
Preliminary trials.

Tasm. J. Agric., 1949, 20: 1-7, bibl. 3.

Trials during the last two years have indicated that substantial increases in yield may be obtained by liming potatoes in some parts of Tasmania. Since potatoes are liable to common scab infection in neutral and alkaline soils, the applications were limited to the amount necessary to raise the soil pH only to 6.5, and no evidence of scab infection was found on any of the tubers from limed plots. At one centre there was no positive response, at others 2 to 24% increase in favour of lime. The results are an indication of a seriously low lime status of the soil.

1330. STENBERG, M., AND OTHERS.

Om kopparhalt i jord och vegetation och resultat av fleråriga gödslingsförsök i koppar. (The copper content of soils and crops and the results of long-term fertilizing trials with copper.) [English summary 6 pp.]

Medd. LantbrAkad. Vetenskapsavd. 4, 1949, pp. 106, bibl. 26.

The study is chiefly devoted to grassland and grain crops, but potatoes are also briefly discussed.

1331. VAN DER PAAUW, F.

Opname, vorming en verdeling van de stof door de aardappelplant bij gevarieerde fosfaatvoeding. (The absorption of phosphate and nitrogen, and their assimilation and distribution in the tissues of potatoes grown under varied phosphate conditions.) *Versl. Landbouwk. Onderz.* 54.3, 1948, pp. 45, bibl. 17.

An account is given of the absorption of P and N, the formation of organic matter and the distribution of these substances in leaves, stems and tubers of

"Triumf" potato plants, grown in a sandy soil under 4 fertilizer treatments, viz. 0, 60, 260, and 600 kg./ha. P_2O_5 as double superphosphate. Only the largest dressing has yielded maximum growth on this soil. The yield increased from 187 to 303 quintals/ha. with increasing phosphate. N was absorbed from the soil from the first under all rates of phosphate, P only by the plants with heavy phosphate dressing. The absorption of N stopped as soon as the first signs of withering appeared, the absorption of P, however, continued till the end of growth.

1332. DA COSTA, J. V. B.

Aplicação da lei de Mitscherlich em ensaios de adubação da cultura da batata na Gafanha. (The application of Mitscherlich's law to manuring potatoes.)

Rev. agron. Lisboa, 1946, 34: 233-41, bibl. 5
[received 1949].

A statistical study of results obtained in a manurial trial with Arran Banner and Up-to-Date potatoes.

1333. PORTSMOUTH, G. B.

The effect of manganese on carbon assimilation in the potato plant as determined by a modified half-leaf method.

Ann. Bot. Lond., 1949, 13: 113-33, bibl. 25, illus.

Techniques for investigating the effect of manganese on the carbon assimilation of potato plants in the field are discussed. An improved half-leaf method of measuring apparent assimilation, used in these investigations at East Malling Research Station, is described. A decrease in apparent assimilation was found to occur as a result of raising the manganese level of Mn-deficient potato plants. This, however, is not taken to indicate a decrease in the real assimilation rate, but rather to be the result of (1) an increase in respiration rate, and (2) an increase in the rate of translocation of assimilates out of the leaf. A highly significant increase in dry weight per unit area occurred as a result of raising the manganese level. It is suggested that this may indicate a dependence of protein synthesis upon manganese.

1334. DEPARTMENT OF COMMERCE AND AGRICULTURE, MELBOURNE.

Developments in mechanical harvesting of potatoes.

Bull. Farm Mech. Branch, Div. agric. Prod., Dep. Comm. Agric., Melbourne, 16, 1949, pp. 17, mimeographed.

An illustrated discussion of various models of potato harvesters used at present in Australia.

1335. NÈGRE, M.

Compte-rendu d'essais effectués dans l'Aveyron. (Potato harvesting trials at Aveyron.)

Pomme de Terre franç., 1948, 12: 113: 15-20, and *Progr. agric. vitic.*, 1948, 130: 324-8.

The tables and graphs presented show, (1) the close relationship that exists between potato yields and the amount of virus infection, (2) that in the Department of Aveyron, southern France, August is the critical month for aphid multiplication, (3) that the optimum dates for haulm destruction are 25 July for the varieties Bintje and Flava, 15 August for Arran Banner and

25 August for Ostbote, and (4) that growers wanting to use their own tubers as seed should harvest very early. Haulm destruction by sodium chlorate at concentrations of up to 4% was found to have no harmful effect on the grain crop following in the rotation. No benefit was derived from the use of ammonium sulphate for the same purpose.

1336. SCHÜEPP, W.

Frostverteilung und Kartoffelanbau in den Alpen auf Grund von Untersuchungen in der Landschaft Davos. (Frost incidence and potato growing in the Alps, on the basis of investigations in the Davos area.)
Reprinted from *Schweiz. landw. Monatsh.*, 1947 [or 1948(?)], pp. 23, bibl. 18.

The meteorological data and observations on frost damage to potatoes, collected around Davos (about 1,600 m. above sea level) from 1942 to 1945, should make it possible to determine the suitability of other Swiss mountain areas for potato growing.

1337. WAGER, H. G.

Experimental evidence that the stem-end blackening pigment of potatoes is a compound of iron.

Biochem. J., 1948, 43: 318-20, bibl. 6.

The compound of iron that was shown to constitute the stem-end blackening pigment of potato has a colourless precursor with a range of concentration greater than that of iron.—*Low Temp. Stat. Res. Biochem. and Biophys.*, Univ. Cambridge and D.S.I.R.

1338. BEDOUET, J.

Le noirissement interne des tubercles.
(Internal blackening of potato tubers.)

Pomme de Terre fran^c., 1948, 12: 113: 27-8.

Internal blackening of potatoes, accompanied by the formation of a cavity inside the tuber, occurred in seed potatoes harvested in July 1947. Controlled tests in 1948 confirmed the impression that the trouble is due to exposure to long hours of sunshine and high temperature in the field after harvest. Although storage life and germination do not seem to be affected, it is advisable not to harvest potatoes during very hot spells.

1339. EDDINS, A. H., RUEHLE, G. D., AND TOWNSEND, G. R.

Potato diseases in Florida.

Bull. Fla agric. Exp. Stat. 427, 1946, pp. 96, bibl. 79, illus. [received 1949].

Diseases discussed are caused by fungi, bacteria and viruses or are due to physiological disturbances. Late blight, common scab, ring rot, soft rot and brown rot are those most likely to cause the greatest losses. Leaf-roll is the most important virus disease, and severe injuries are caused by frost, heavy rain and drought. Control measures recommended for the most important diseases and injuries are summarized.

1340. ANON.

Ziekten van aardappelknollen. (Disorders of potato tubers.)

Meded. PlZiekt. Dienst, 1948, 9, pp. 26, illus.

This is a comprehensive survey of all the ills that beset potatoes, the effects of which can be seen on the tubers.

Descriptions of insect damage and disease symptoms are supplemented by numerous photographs to aid diagnosis. Brief control measures are given. Physiological disorders, that might be mistaken for infectious diseases, are included, but not those virus diseases that, although seed-borne, cannot be detected by examination of the tubers alone.

1341. MILBRATH, J. A., AND ENGLISH, W. H.

A late-breaking virus disease of potatoes.
Abstr. in *Phytopathology*, 1948, 38: 917.

A graft-transmitted virus disease of potatoes in Oregon causes the stems to stand erect, with aerial tubers in nearly every leaf axil, and yellow, rolled leaves, these symptoms appearing late in the season.

1342. LOCKE, S. B.

Studies on the chemotherapy of potato virus diseases.

Abstr. in *Phytopathology*, 1948, 38: 916.

Treatment of a hill of leafroll-infected Netted Gem potatoes with 0.2% 2,4-D resulted in the complete masking of symptoms in the new growth produced after treatment, and also in the first vegetative generation of plants grown from the tubers of the treated plants.

1343. OSWALD, J. W., AND KENDRICK, J. B.

Leaf roll, net necrosis, and stem-end browning in Netted Gem potatoes in California.

Abstr. in *Phytopathology*, 1948, 38: 917-18.

Leaf roll is a serious disease of Netted Gem potatoes, reducing yields and causing net necrosis of the tubers. This variety also develops stem-end browning. Tuber indexing showed that net necrosis was definitely associated with leaf roll, but stem-end browning was not. Mature tubers harvested after killing frost showed 40-50% net necrosis and 10-15% stem-end browning with no subsequent increase in either disease in cellar or cold storage.

1344. BROADBENT, L.

Methods of recording aphid populations for use in research on potato virus diseases.

Ann. appl. Biol., 1948, 35: 551-66, bibl. 26.

It is concluded, from the data obtained, that an estimate of the number of aphids per plant is better for virus disease research than the number per 100 leaves. A method of estimating the number of aphids per plant with tolerable accuracy is described.—Rothamsted Experimental Station.

1345. ANSCOMBE, F. J.

On estimating the population of aphids in a potato field.

Ann. appl. Biol., 1948, 35: 567-71.

This is an appendix to the paper by L. Broadbent (see preceding abstract) and deals with the statistical problem of estimating the population of aphids per plant in a field of growing potatoes.—Rothamsted Experimental Station.

1346. SALZMANN, R.

Über die Bakterienringfäule der Kartoffeln.
(The bacterial ring rot of potatoes.)

Reprinted from *Schweiz. landwirtsch. Monatsh.*, 1947, Vol. 25, No. 2, pp. 7, bibl. 9 [received 1949].

Owing to the scarcity of potatoes on the Continent in 1946, supplies had to be imported from America. The possibility of introducing potato diseases in this way, particularly bacterial ring rot caused by *Corynebacterium sepedonicum*, was considered, so samples of imported potatoes were examined and suspected tubers tested, some of them being found to be infected. The symptoms of the disease, based on American work, are described.

1347. KNORR, C., AND VAUGHN, J. R.

Potato ring rot control through use of seed dips and the disinfested stationary cutting knife.

Quart. Bull. Mich. agric. Exp. Stat., 1948, 31: 71-82, bibl. 5.

All the numerous dips tested either did not check the spread of ring rot (*Corynebacterium sepedonicum*) in cut seed potatoes or proved injurious to the seed. However, the simple method of continuously disinfecting a stationary cutting knife by a trickle of mercuric chloride (1: 500) has given the desired measure of control in 2 years' trials. The "trickle knife" is illustrated and its construction is described as follows: "All that is required is a can or crock with a petcock at bottom, rubber tubing extending from the petcock to the top of the knife blade, and a sleeve of lamp-wick inserted between blade and tubing to insure trickling of solution over both surfaces of the knife."

1348. PERRAULT, C.

Études sur la pourriture du cerne des pommes de terre causés par *Corynebacterium sepedonicum* (Speck. et Kott) Skaptason et Burkholder. II. Les moyens de lutte. (Bacterial ring rot of potatoes. II. Methods of control.) [English summary.]

Sci. Agric., 1948, 28: 518-30, bibl. 26, being *Contr. Div. Bot. Plant Path. Sci. Serv., Dep. Agric. Canada* 941.

A study of the means of transmission of potato ring rot, and the use of disinfectants for its control, undertaken at the Laboratoire fédéral de Pathologie végétale, Sainte-Anne-de-la-Pocatière, Quebec, leads the author to assert emphatically that the only effective control for ring rot is the use of clean seed. Formalin and mercurinol, used as a dip for cut tubers, were found to give a certain degree of control, but a delay of even a few hours in treatment reduced the effect considerably. Disinfection of the knife is also desirable but difficult. Roguing diseased plants in the field is a slow and impracticable method of control. All these practices should be considered only as additional precautions to the use of clean seed. The ultimate solution may lie in the development of resistant varieties, but of the varieties tested only Rural Blush, President, and Dakota Red showed any promise.

1349. TERMAN, G. L., STEINMETZ, F. H., AND HAWKINS, A.

Effects of certain soil conditions and treatments upon potato yields and the development and control of potato scab.

Bull. Me agric. Exp. Stat. 463, 1948, pp. 31, bibl. 7.

In the experiments described development of potato

scab (*Actinomyces scabies*) was closely related to the amount of ground limestone applied and the resulting pH and calcium content of the soil. Severe infection can be reduced or eliminated by one or two applications of sulphur or ammonium sulphate. Potato yields are greater in the pH range of 4.55 to 6.00 than at much higher or much lower soil pH levels. Applications of 300, 600 and 900 lb. of sulphur per acre were not toxic and had little effect on potato yields, but at 1 ton per acre sulphur was very toxic. Lime should not be applied to the finer-textured potato soils in amounts exceeding 2,000 lb. of ground limestone per acre, or 1,000 lb. on sandy soils.

1350. LANSADE, M., AND ANSELME, C.

Essais de traitement du rhizoctone brun de la pomme de terre. (Control of potato black scurf.)

C.R. Acad. Agric. Fr., 1949, 35: 82-4.

The experiments recorded for the control of potato black scurf [*Corticium (Rhizoctonia) solani*] show that formalin and certain organic mercurial preparations in solution are promising for seed tuber treatment, but that dusts are unsatisfactory.

1351. ANDRÉN, F.

Besprutningsförsök mot potatisbladmögel 1948. (Potato blight control 1948.) *Växtskyddsnotiser*, 1948, pp. 85-7.

In comparative trials with a number of fungicides, carried out at Nickleby, the average increase in tuber yield as a result of spraying amounted to 4,500 kg. per hectare, although blight infection did not appear until the middle of September.

1352. BJÖRLING, K.

Bidrag till kännedomen om potatiskräfts-vampens (*Synchytrium endobioticum* [Schilb.] Pers.) biologi. (A biological study of the potato wart fungus.) [English summary 2 pp.]

Medd. Växtskyddsanst. Stockh. 52, 1948, pp. 21, bibl. 10.

The experiments show that (1) a preceding *Rhizoctonia solani* infection of potato tubers has an inhibiting effect on tumour formation resulting from subsequent inoculations with *Synchytrium endobioticum*; (2) the presence of the potato viruses X, Y, or leaf roll has no influence on susceptibility to wart disease; and (3) in contrast to reports from Central Europe no strain of *S. endobioticum* has been found in Sweden attacking varieties which have so far proved immune to wart disease.

1353. BOSCH, E.

Untersuchungen über die Biologie und Bekämpfung der Vermehrungspilze *Moniliopsis Aderholdi* und *Rhizoctonia solani*. (Biology and control of the damping-off fungi *M. aderholdi* and *R. solani*.) [French summary ½ p.]

Landw. Jb. Schweiz., 1948, 62: 791-825, bibl. 29.

The results show that incidence and extent of damping-off in vegetable seedlings is largely determined by environmental conditions, such as temperature, moisture, pH and density of the plants. Although the optimum temperature for *Moniliopsis* is 23° C.,

the fungus causes great losses at 14-15° C., while *Rhizoctonia solani* does not attack seedlings at temperatures below 20° C. Differences in soil had no influence on the degree of infection. Heat sterilization was found to be the best means of control. Biological control by antagonistic soil fungi does not seem likely.—Wädenswil Research Station.

1354. ANON.

Ontsmetting van pootaardappelen tegen *Rhizoctonia*. (Disinfection of seed potatoes against *Rhizoctonia*.)

Vlugschr. PlZiekt. Dienst 41, 1948, pp. 4, illus.

This pamphlet describes the means by which the fungus is spread, and the symptoms by which it can be recognized in the field and on the tubers. Details are given of commercial methods of disinfecting the seed tubers with proprietary substances.

1355. BONNEMaison, L.

La lutte chimique contre les taupins. (Click beetle control.)

Pomme de Terre fran^c., 1949, 12: 113: 7-13, bibl. 6.

Experiments, carried out at Versailles and at Pleyber-Christ, showed that at present click beetles can be controlled only in the larval stage and that hexa-chlorocyclohexane and its sulphur derivative are the most promising compounds for soil treatment. Their drawback is that the effective dosage of 10-12 kg. of the pure chemical per hectare causes a bad flavour in potato tubers and that it is phytocidal unless applied in autumn or at least several weeks before the seed is put in. It is suggested that the soil should be treated with hexa compounds 1-2 years prior to planting potatoes, this treatment to be followed up with applications of such chemicals as D-D.

1356. GRISON, P.

Le doryphore et le ricin. (The Colorado beetle and the castor bean.)

Pomme de Terre fran^c., 1949, 12: 113: 20-2, bibl. 4.

As laboratory tests and field observations show, there is no foundation for the belief that castor bean plants have a repellent effect on the Colorado beetle.—Versailles.

1357. LANDIS, B. J.

Plants upon which tuber flea beetles and western potato flea beetles propagate.

J. econ. Ent., 1948, 41: 6-10, bibl. 9.

A survey of the alternate feeding and propagating hosts of *Epitrix tuberis* and *E. subcrinita*. The most common sources of infestation for early crop potatoes seem to be the tomato, European bitter sweet, and black nightshade, although many cultivated plants and weeds, including non-solanaceous plants, are potential hosts. On emerging from hibernation, the tuber flea beetles concentrate on the early potato crop: hence careful spraying at this stage will help to prevent large-scale infestations of later crops.

1358. DAVIS, E. W., LANDIS, B. J., AND RANDALL, T. E.

A potato resistant to tuber infestation by flea beetle larvae.

J. econ. Ent., 1948, 41: 10-12, bibl. 5.

Comparative trials were made with the Doe Bay Red potato, a variety reported to be resistant to the tuber flea beetle, and the commercial varieties Chippewa, Netted Gem, White Rose, and Burbank. Although it was found that the foliage of Doe Bay Red was susceptible, and more larvae developed to maturity on this variety than on any of the others, the tubers showed significantly less injury from the larvae.—Bureau of Ent. and Pl. Quarantine.

1359. TURNER, N., AND WOODRUFF, N.

Chlorinated insecticides for control of potato flea beetle.

J. econ. Ent., 1948, 41: 328-9, bibl. 6.

That the fineness of particle size is an important factor in the control of potato flea beetle by DDT dusts is proved in tests made at the Connecticut Agric. Exp. Stat. It was also shown that DDT, applied as a fine dust, is more effective than as an emulsion. It gives better control of flea beetle than either methoxy DDT, chlordan or chlorinated camphene. This last substance caused damage to potato leaves when applied at 1 lb. per 100 gal.

1360. PARKER, W. L., WARREN, J. C., AND STEARNS, L. A.

Chlorinated camphene on potatoes.

J. econ. Ent., 1948, 41: 275-7, illus.

Treatment of Irish Cobbler potatoes with chlorinated camphene and DDT, alone and in combination with fungicides (Zerlate, Dithane 278, and copper oxy-chloride), showed that chlorinated camphene gives as good control of potato flea beetle as DDT. It is also compatible with these three fungicides. The 25% wettable powder, 32% water miscible, and 50% water dispersible forms of chlorinated camphene, at concentrations of 1 lb. per 100 gal., caused no damage to foliage.—University of Delaware, Newark.

1361. HOFMASTER, R. N., AND ANDERSON, L. D.

Potato tuberworm control in Virginia.

J. econ. Ent., 1948, 41: 198-201, bibl. 5.

Recently the incidence of the potato tuberworm, *Gnorimoschema operculella* (Zell.), has seriously increased, and in dry seasons much damage is caused in the field and in storage. Trials of its control by DDT, DDD and benzene hexachloride were carried out at the Virginia Truck Experimental Station, Norfolk. Complete control was obtained on potatoes stored in DDT-treated bags (1-5% DDT in xylene solution), and the treated bags still gave control 10 months after dipping. Incorporation of paper treated with 5% DDT gave good, but less complete, control. In the field 2 applications of 2% DDT dust, 5% DDD dust, and 1% gamma benzene hexachloride dust all gave 99% control. Spray applications of the first two substances in the form of wettable powders were equally effective, but benzene hexachloride in this form gave poor control.

1362. PLETSCH, D. J.

The potato psyllid, *Paratriozza cockerelli* (Sulc.), its biology and control.

Bull. Mont. agric. Exp. Stat. 446, 1947, pp. 95, bibl. pp. 9.

The emphasis of this investigation is on the biological rather than on the plant protective side. In normal

years one or two applications of 5% DDT dust against Colorado and flea beetle will keep the psyllid in check. Whenever the infestation reaches an alarming level, such as 5-10 psyllids per plant before the middle of July, 2-3 additional applications should be made at 10-day intervals.

1363. WALLIS, R. L.

Time of planting potatoes as a factor in prevention of potato psyllid attack.

J. econ. Ent., 1948, **41**: 4-5, bibl. 3.

The results of a survey of the psyllid population on early, medium and late crop potatoes in districts of Wyoming and Nebraska show that the early crop is much more subject to attack than crops planted after 1 June. High July temperatures prevent the development of psyllid populations on small plants, but they thrive on the tall growth of the early crop. Careful control of psyllid on these early plantings is needed to prevent a later infestation on the main crop. It is suggested that it would be even better to delay planting until after 15 June.

1364. THOMPSON, H. W.

The potato-root eelworm (*Heterodera rostochiensis* Woll.) in the United Kingdom.

Emp. J. exp. Agric., 1949, **17**: 60-71, bibl. 20.

The author surveys the subject from the standpoint of history, areas affected, symptoms of attack on potatoes and tomatoes, other factors involved in potato sickness, how infection spreads, influence of soil types, control methods, trial results, manurial treatments, chemicals for delaying hatch and destroying cysts, biological control, control in tomato-houses, field surveys, and the cropping of infested land. The only practicable means available at present for maintaining potato crops at a satisfactory level is to follow a cropping system that will not result in an increase of eelworm infestation in the soil. This would mean in many instances lengthening the existing rotation.

1365. COHEN, M.

Potato root eelworm in the Northern Province [of England].

N.A.A.S. quart. Rev., 1949, **1**: 143-5.

A note on the position in County Durham, with some advice on preventing the increase and spread of the pest. Experience has demonstrated the value of systematic sampling of farms to determine which fields are infested, and to what extent.

1366. PETERS, B. G.

The potato root eelworm problem.

Agriculture, 1949, **55**: 493-8, bibl. 13.

Eelworm damage constitutes a serious problem in the main potato-growing districts of England. A brief account of the history and distribution of this eelworm, *Heterodera rostochiensis*, is followed by short notes on the spread of its cysts, degree of infestation, control by rotations and chemical means, recent trials, and the possibility of biological control. So far as can be foreseen, it seems likely that various methods of control will be combined. When population rates are known, chemically stimulated hatching after a crop of potatoes will be followed by fumigation, and then by a short rotation of non-susceptible crops. In some areas it

may be possible to work in a grass crop before fumigation. As long as the decrease in population brought about by all these methods is not less than the increase from a single potato crop, the population can be kept under control.

Mushrooms.

1367. TRESCHOW, C.

Nutrition of the cultivated mushroom.*

Dansk Bot. Ark., 1944, Vol. **11**, Nr. 6, pp. 180, bibl. numerous, illus. [received 1949].

An account of work carried out in the Laboratory of Plant Physiology of the Royal Agricultural College, Copenhagen, in 1939-43. Temperature, pH, nutrient content of medium, growth substances and their effect on the growth of the cultivated brown mushroom *Psalliota bispora* (Lge.) Schäffer and Møller f. *avellanea* (Lg.) and white mushroom *P. bispora albida*, were carefully watched during the years of the trial and the observations are here recorded. It was found that the top layer of litter from Norway spruce plantations could be turned into a particularly suitable medium for mushroom growing—fully as good as the usual composted horse manure—by adjusting the pH to 7-8 by the addition of CaCO_3 and by submitting this medium to partial sterilization. The process is described.—Botanisk Museum, Gothersgade 130, Copenhagen K.

1368. SINDEN, J. W., AND YODER, J. B.

Effect of copper and certain dithiocarbamate fungicides on the control of *Verticillium* spot and bubble of mushrooms.

Abstr. in *Phytopathology*, 1949, **39**: 22.

Of the preparations tested Parzate (zinc ethylene bisdithiocarbamate) proved the most effective. It is being used commercially in three applications of 0.5 lb. per 100 gal. sprayed in amounts of one qt. per 10 sq. ft. of bed.

Tobacco.

1369. WISE, H. L.

Tobacco growing and manufacture in New Zealand.

Whitcombe & Tombs, Christchurch, 1948 (?), pp. 110.

A booklet giving the history of the growth and development of the industry in New Zealand, including a chapter on leaf production and preparation, and some short notes on the activities of the Cawthron Institute, the Tobacco Research Committee and the Tobacco Research Station, Umukuri.

1370. BROWN, D. D.

Turkish tobacco culture in Southern Rhodesia.

Rhod. agric. J., 1948, **45**: 523-47, bibl. 2.

A long article covering climate, soils, rotations (of which 12 are shown), all necessary nursery and field operations, priming, seed selection, harvesting, stringing, curing and handing, conditioning and baling.

* Reprinted from *Dansk. Botanisk Forening*.

1371. SKOOG, F., AND TSUI, C.
 Chemical control of growth and bud formation in tobacco stem segments and callus cultured *in vitro*.
Amer. J. Bot., 1948, 35: 782-7, bibl. 13, illus.

A report of experiments carried out at the University of Wisconsin, Madison, demonstrating "(1) that bud formation in callus tissue and in stem segments of tobacco cultured *in vitro* can be induced by chemicals added to the medium, and (2) that nearly complete control of the type of growth that will occur, i.e. the formation of roots, buds or undifferentiated growth of tissues, can be obtained by the application of different proportions of auxin and adenine to the medium". Adenine or its derivatives appear to be as "specific" for bud formation as compounds of the auxin group are for root formation. It is shown, however, that sugar and phosphate levels, as well as pH, are intimately concerned in both types of regeneration, and that the effects of adenine and auxin on both growth and organ formation must be interpreted in quantitative rather than qualitative terms.

1372. CORBETT, G.
Report on the yellow leaf tobacco industry and the possibility of cultivating Virginian tobacco in Cyprus.
 Cyprus Govt. Printing Office, Nicosia, 1948, pp. 56, bibl. 10, 3s.

The report includes a review of the industry since its beginnings, and the findings of investigations into the causes of poor quality in the present type of yellow leaf tobacco grown in the island.

1373. HINTON, D. R.
Latakia tobacco.
For. Agric., 1949, 13: 44-5, illus.

A brief history of the way the dark Latakia tobacco came on the market and an account of the method of smoke-curing adopted.

1374. McMURTREY, J. E., Jr.
Growing better tobacco.
Econ. Bot., 1948, 2: 326-32, bibl. 20, illus.

The treatment of tobacco seedbeds, cropping systems, fertilizer practices and curing methods are discussed in this paper from the U.S.D.A. Plant Industry Station, Beltsville, Md. Practical control of root knot can be attained by growing tobacco in a 3-year rotation using Spanish peanuts, and oats or rye. However, the system of allowing a 2- or 3-year weed cover between crops is considered preferable, for the fertility level, freedom from disease, and tilth of the soil is increased to such an extent that a high quality product is usually produced.

1375. WILBRAHAM, R. E., AND JACKSON, R. E.
Pit barns for fire cured tobacco on native trust land in the Central Province [Nyasaland].
Nyasaland agric. Quart. J., 1948, 7: 72-7, illus.

Instructions are given for building and operating simple pit barns, constructed largely from pisé de terre. Many thousands of these barns are in operation in Nyasaland. The design is shown in cross section.

1376. LOWE, C. E.
Management of the coal furnace for tobacco barns.
Rhod. agric. J., 1948, 45: 436-42, illus.

Coal has certain advantages over wood for heating tobacco barns [in S. Rhodesia]. Proper methods of procedure for coal firing are described and the necessary tools and accessories are enumerated.

1377. VAN SCHREVEN, D. A.
Onderzoeken met betrekking tot enkele plagen en ziekten van Vorstenlandse tabak. (Investigations on certain pests and diseases of Vorstenland tobacco.) [English summary 2½ pp.]
Tijdschr. PLZiekt., 1948, 54: 149-74, bibl. 30.

This report on investigations carried out at the Research Station for Netherlands Indies tobacco includes accounts of trials for the control of the cigarette beetle (*Lasioderma serricorne*), "dikbuik" (*Gnorimoschema heliopa*), slime disease (*Pseudomonas solanacearum*), frog-eye (*Cercospora nicotianae*), and virus diseases.

1378. KOSTOFF, D. (AND GEORGIEVA, R.).
*Resistance to tobacco mosaic virus. I. Tobacco varieties resistant to mosaic virus obtained by crossing. II. Inheritance of necrotic reaction and plant breeding value of the form *Nicotiana tabacum* var. *virii*.* [Bulgarian and English.]
Publ. centr. agric. Res. Control Inst. Sofia, 1944, pp. 56, bibl. 14.

These two papers are published together, with their translations in English: Part I, by Kostoff, pp. 1-12 and 35-45; Part II, by Kostoff and Georgieva, pp. 46-55, with a joint bibliography. Part I discusses the theory of breeding tobacco for resistance to mosaic and gives an account of the evolution of a strain, referred to as *Nicotiana tabacum virii*, which is homozygous to necrotic reaction. In Part II the progeny of crosses between that strain and other varieties are described. The authors state that "the populations, obtained from the crosses between *N. tabacum virii* and the varieties of tobacco with small leaves that were homozygous in respect to the reaction with local necrosis, represent from a practical point of view very valuable sources for production of resistant tobacco varieties".

1379. THUNG, T. H.
Waarnemingen over enkele plantenviren met het electronenmicroscoop. (Studies of some plant viruses with an electron microscope.) [English summary.]
Chron. Nat., 1948, 104: 344-8, bibl. 19, illus.

In an attempt to study the virus particles of tobacco mosaic in the form in which they exist in the plant, bleeding sap was observed under an electron microscope. The author supports the view that naturally occurring particles of this virus are not of a uniform size. Various theories of aggregation are discussed. A study of 5 viruses indicates that aggregation is not a general characteristic of viruses.

1380. LEONTJEV, I. F.
The food value of the tobacco mosaic virus. [Russian.]
Priroda (Nature), 1949, No. 1, pp. 75.

The food value of tobacco mosaic virus is discussed in relation chiefly to its aminoacids, the amounts of which compare favourably with those in cow's milk. Reference is made to the work of Chandler and others in *J. biol. Chem.*, 1947, 171: 823.

1381. GIGANTE, R.

Le malattie batteriche e crittomiche dei semenzi di tabacco. (Bacterial and fungal diseases of tobacco seedbeds.)

Il Tabacco, 1949, 53: 3-29, bibl. 5.

The author discusses briefly the incidence and phenomena of the following affections of tobacco seedbeds with notes on prevention and cure:—damping off (*Pythium de baryanum*), root rot (*Thielavia basicola*), yellowing (*Olpidium brassicae*), black shank (*Phytophthora nicotianae*), blue mould (*Peronospora tabacina*), Rhizoctonia disease (*Rhizoctonia* spp.), and dodder (*Cuscuta* spp.). The author concludes with general notes on the care of tobacco seedbeds.

1382. CLAYTON, E. E.

Controls developed for blue mold of tobacco.

Res. Achievement Sheet (R.A.S.), U.S. Dep. Agric. 107(P), 1948, pp. 2, bibl. 4.

Tobacco growers now have a choice of three methods of blue mould (*Peronospora tabacina*) control: gas (paradichlorobenzene), spray (copper oxide and cotton-seed oil), and spray or dust (several new organic fungicides).

1383. GIGANTE, R.

Un avvizzimento del tabacco causato da "Fusarium". (Fusarium wilt of tobacco near Rome.)

Il Tabacco, 1948, 52: 368-74, bibl. 7.

An account of the occurrence of Fusarium wilt of tobacco. The phenomena of the attack and the varying susceptibility of different types are noted. Thus White Burley and Maryland are very susceptible, whereas Connecticut Havana, Cuban and Sumatra are highly resistant. The chief hope lies in prevention by cultural methods, e.g. complete removal and destruction of infected plants, avoidance of irrigation with water which may be infected, avoidance of the growth of tobacco or any *Solanaceae* on infected land for 3 years, and possibly soil sterilization.

1384. CLAYTON, E. E.

New wilt-resistant tobacco variety worth \$2,000,000 annually.

Res. Achievement Sheet (R.A.S.), U.S. Dep. Agric. 106(P), 1948, pp. 2, bibl. 2.

Describes how the new tobacco variety, Oxford 26, was produced. In 1947 about 80,000 acres, practically all wilt-infected land, was planted to this variety.

1385. SCARAMUZZI, G.

L'oidio del tabacco (*Erysiphe cichoracearum*). (Tobacco mildew.)

Il Tabacco, 1948, 52: 207-22, bibl. 36.

A review of the present position with regard to tobacco mildew with notes on its incidence, phenomena and possible control. Although the morphology of the leaf and climatic factors are obviously very important, the author considers that direct control is within the bounds of possibility, based on the use of sulphur in a state of very fine division, colloidal or sub-colloidal

and of organic derivatives of that element; such substances are discussed.

1386. CLAYTON, E. E., AND OTHERS.

Soil treatments with chemicals for the control of tobacco parasites.

Abstr. in *Phytopathology*, 1949, 39: 4-5.

In the flue-cured tobacco growing area chemical soil treatments are effectively controlling both weeds and diseases. Combinations of cyanamide and sodium azide, and allyl alcohol and ethylene dibromide, gave effective weed and root knot control.

1387. CURCIO, M.

Su l'anguilla radicicola (*Heterodera marioni*). (Tobacco root eelworm.)

Il Tabacco, 1948, 52: 290-6, bibl. 6, illus.

Chemical methods are expensive and will do little good unless combined with proper cultural care. That consists in (1) keeping the ground fallow for at least 2 consecutive years, (2) sowing *Crotalaria spectabilis* for 2 consecutive years, (3) growing black mustard in infested ground, (4) growing plants to attract the eelworm such as colza, rutabaga and crucifers in general and their removal and destruction at the appropriate time.

1388. BARE, C. O.

The effect of prolonged exposure to high vacuum of stored-tobacco insects.

J. econ. Ent., 1948, 41: 109-10, bibl. 2.

The eggs of cigarette beetle are very resistant to desiccation, and so are not killed easily by exposure to vacuum. From results of experiments at the Bureau of Entomology and Plant Quarantine, however, the author concludes "that, if it were practical to keep manufactured tobacco products in vacuum for a period of approximately 10 days, complete mortality of all stages of the cigarette beetle and the tobacco moth would be obtained".

Hops.

1389. HOED, F., AND ELSOCHT, P.

Contribution à l'étude de l'amélioration du houblon en Belgique. (Hop improvement in Belgium.)

Ann. Gembl., février 1939, pp. 65-120.

HOED, F., AND ELSOCHT, P.

Essais de fumures organisés en 1938 par le Cercle d'Études et de Recherches pour l'amélioration du houblon en Belgique. (Hop manurial experiments in Belgium carried out in 1938.)

Ann. Gembl., avril 1940, pp. 113-33.

HOED, F.

L'institut national belge du houblon. (The Belgian national hop institute.)

Ann. Gembl., 1947, 53: 113-16.

Hop areas in Belgium, covering more than 4,000 hectares in 1880, gradually fell to 466 ha. during the recent war. In 1932 a society was formed with the idea of resuscitating the industry by research and modern methods. Manurial trials were made despite the small funds available and hop material was obtained from abroad. In 1943 the society decided to set up a

hop institute. In 1944 a small area was planted with selected varieties and in 1946 the National Hop Institute was finally established. At present (1947) the Institute possesses nearly 1 hectare at Esschene with the use of a further 2½ hectares. Its immediate aims are to study varieties, manuring and plant protection, and drying.

Medicinal plants.

1390. DOUMONT, L., AND VALLEMBERG, M.
Les plantes médicinales. (Medicinal plants.)
Courr. hort., 1949, 11: 119.

Notes on the pharmaceutical properties of the male fern (*Polystichum filix mas*) and of rue (*Ruta graveolens*).

1391. ROSSIJSKI, D. M.
Russia's wealth of medicinal plants. [Russian.]
Nauká i Žiznj (Science and Life), 1948, No. 5, pp. 26-31, illus.

A historical survey of early work in Russia on medicinal plants is followed by an account of some of the most interesting native plants and their medicinal properties, and of the places where investigations are being carried out. Among them a number of vitamin-producing plants are mentioned and reference is made to seaweeds as sources of iodine and agar-agar and to camphor-yielding plants.

1392. GERLACH, G. H.
Datura innoxia—a potential commercial source of scopolamine.
Econ. Bot., 1948, 2: 436-54, bibl. 135.

A study of the alkaloid content of *Datura innoxia*, a native of Mexico that has previously been much confused with other datura species, revealed that this plant is a valuable potential source of the drug scopolamine. It can be grown commercially in a wide range of soil and climatic conditions. The germination of the seed, which is normally slow and uneven, can be accelerated by alternate freezing and thawing to weaken the seed coat. The seeds may be sown in spring in drills 3 ft. apart, and the entire plant should be harvested with a mower at the time of flowering to obtain a maximum alkaloid yield. Plants should be dried at a temperature of 60° C. and ground in a Mead mill, at which stage they are ready for extraction.

1393. LEBEDEV, D. V.
Wormwood and its effect on neighbouring plants. [Russian.]
Priroda (Nature), 1948, No. 9, pp. 63-4, bibl. 4.

The author reviews the work of H. R. Bode (*Planta*, 1939, 30: 566) and of G. L. Funke (*Blumea*, 1943, 5: 281) on the antagonistic effect of wormwood (*Artemisia absinthium*) on other plants. Bode found that it had an inhibiting effect on fennel (*Phoeniculum vulgare*) seedlings growing within 130 cm. of it, and Funke, following this up, found that wormwood was antagonistic to sage, carnation, dahlia, flax, peas, hyssop, etc., and particularly lovage (*Levisticum officinale*), on which the effect was lethal at distances less than 1 metre.

1394. WEIBEL, R. O.

The castor-oil plant in the United States.
Econ. Bot., 1948, 2: 273-83, bibl. 15, illus.

Attempts are being made in the United States to increase the production of castor beans. This paper gives a brief survey of the areas in which this industry might be developed, and of the progress that is being made in the breeding of improved varieties. Notes are given on culture and disease.

1395. ORTEGA, R., AND LANGHAM, D. G.

Obtención de un nuevo tipo de tártago (*Ricinus communis* L.) por hibridación. (Obtaining a new variety of castor bean by hybridization.) [English summary.]
Circ. Dep. Genet. Minist. Agric. Venezuela 27, 1947, pp. 11, bibl. 3, illus.

In the course of work by the Experimental Institute of Agriculture, Venezuela, on the breeding of more productive varieties of castor bean, it was noticed that a stray seedling with spineless fruit did not become infected with grey mould (*Sclerotinia ricini*). This resistance was found to be related to the smoothness of the fruit, and to the fact that the ovaries and fruit had a fatty covering, both reducing water retention. This seedling was crossed with a dwarf commercial variety, Enano de Brasil, and produced an F_2 generation combining dwarfness with spinelessness. Further selection is being made for other desirable commercial characters. A genetical study of the progeny of this cross showed that the character for spine bearing is only partially dominant.

1396. BULLIS, D. E., PRICE, F. E., AND KIRK, D. E.

Relationship of maturity and weathering to yield and quality of peppermint oil [in Oregon].

Stat. Bull. Ore. agric. Exp. Stat. 458, 1948, pp. 15, illus.

A record of studies over 3 seasons, confined mainly to the Lower Columbia mint area. The amount and quality of oil from weathered mint was not materially different from that of freshly cut mint when all shattered leaves from the weathered mint were distilled with the sample. Weathering losses appeared to be the result of a physical loss of leaves rather than a decrease in oil content. Oil cells of mint increased rapidly in size and number until full-bloom stage. After full bloom, size increased slowly and the number of cells remained about constant. The time at which the oil cell size and number approached a maximum coincided closely with the point of maximum per acre yields of dry hay and oil and occurred at about full-bloom stage. [From authors' summary and conclusions.]

1397. CHAPMAN, V. J.

Seaweed resources along the shores of Great Britain.

Econ. Bot., 1948, 2: 363-78, bibl. 11, illus.

A report of the survey of certain brown algae growing round the coasts of Britain, that was conducted during the war by the Marine Biological Laboratory at Plymouth. The commercial value of these algae for the production of thread made such a survey desirable.

Other crops.

Noted.

1398. BENEDICT, H. M.

The effect of waste products from the guayule rubber mill on the growth of various crops.

J. Amer. Soc. Agron., 1948, 40: 1005-16, bibl. 9.

Trials were conducted at the Rubber Research Field Station, Salinas, California, on crops of lettuce, cotton, maize and pinto beans, to determine whether the waste products of guayule contain substances toxic to other plants. "The results indicate that the leaves from the guayule mill can be safely applied to soils and that the effluent can be used for irrigation without retarding the growth of crops; but that bagasse can be safely applied to soil only where a great abundance of nitrogen is available or along with a supply of nitrogen."

1399. PERVUHIN, F. C.

The effect of ecological factors on the accumulation of resin in the latex of *Euphorbia biglandulosa*. [Russian.]

Priroda (Nature), 1949, No. 1, pp. 80-2.

Euphorbia biglandulosa is of some economic importance since its tissues contain acids, resins and oils. Its seeds contain up to 34% drying oil, with an iodine value of 197.9. An examination of material from various regions showed that the percentage of resin present increased with height above sea-level and decreased with temperature.

1400. MORGESTERN, C., AND TOBLER, F.

Zur wissenschaftlichen und praktischen Kenntnis der Kautschukpflanze *Taraxacum kok saghyz* Rod. (A scientific and practical study of the rubber plant *T. kok saghyz*.)

Planta, 1948, 36: 188-98, bibl. 4.

Problems discussed are (1) Root anatomy and latex tubes. (2) The effect of different soils on yield: The average fresh weight of 10 roots grown on leaf mould, bog earth, loam soil and sandy soil amounted to 63, 53, 14 and 5 g. respectively, with a rubber content of 3.5, 3.5, 3.1 and 2.2% respectively. Thick roots, i.e. those harvested from leaf mould and bog soil, contained a higher number of lactic and sieve tubes than those grown on sand, but the latter contained more tubes per unit area of cross section. (3) Small-scale manurial trials with plants in pots show the beneficial effect of fertilizers on root yield and rubber content. (4) Good results were obtained with root cuttings of a length of 1.5-2 cm. planted 1-2 cm. deep. Thicker cuttings were somewhat more resistant to adverse conditions than thin ones.—Technische Hochschule, Dresden.

1401. CHEVALIER, R., AND PIAT, J.

Essais comparatifs de rendement de carthame (1948). (Comparative yield trials of safflower varieties.)

C.R. Acad. Agric. Fr., 1949, 35: 86-8.

The results of trials with varieties of safflower (*Carthamus tinctorius*) in the south of France are described and tabulated. The ordinary spinous and two spineless forms gave satisfactory results but certain Indian strains were inferior.

1402.

II BROWN, R. P. C., AND STEWART, K. M. A method of separating the main chemical constituents of *Pisum sativum*.

Biochem. J., 1948, 43: xx-xxi, bibl. 1.

b BUCHINGER, A.

Kürbiszüchtung. Mit allgemeinen biologischen Ausblicken. (Pumpkin breeding. With a discussion of general biological principles.)

Bodenkultur, 1948, 2: 10-27, bibl. 39.

c CAVALLINI, G.

Una visita al Monopolio Svedese. (A note on State tobacco growing in Sweden.)

Il Tabacco, 1948, 52: 355-67.

d COMMONER, B.

Some studies of the effects of viruses on the metabolism of infected plants.

Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 808.

Viruses of coleus and tobacco are studied.

e DELOACH, D. B., AND MOORE, J. C.

Trial shipments of Oregon late-crop potatoes. *Bull. Ore. agric. Exp. Stat.* 460, 1948, pp. 32. Deals with marketing.

f DUDLEY, J. E., JR., BRONSON, T. E., AND STONE, P. V.

Comparative effectiveness of three types of DDT dust mixtures against pea aphids. *J. econ. Ent.*, 1948, 41: 518-19, bibl. 1.

g EKINCI, A. S.

Garbı Anadolu ve Trakya mintaka-larında Kavun ve Karpuz ziraati ve çeşitleri hakkında ilk Rapor. (First report on melon and watermelon growing and varieties in western Anatolia and Thrace.)

T.C. Yüksek Ziraat Enstitüsü, Ankara, No. 76, 1937, pp. 48, illus. [received 1949].

h EKINCI, A. S.

Türkiye fasulye soy ve çeşitlerinin sistematik ve morfolojik tetkiki ve standartasyona baslamak için ilk mesai. (Turkish beans, a systematic study of the varieties and their morphology and an attempt at standardization.)

T.C. Yüksek Ziraat Enstitüsü, Ankara, No. 69, 1939, pp. 207, bibl. 25, illus. [received 1949].

i HULBARY, R. L.

Three-dimensional cell shape in the tuberous roots of *Asparagus [sprengeri]* and the leaf of *Rhoea [discolor]*.

Amer. J. Bot., 1948, 35: 558-66, bibl. 19, illus.

j JANSEN, E. F.

The isolation and identification of 2,2'-dithiolisobutyric acid from asparagus.

J. biol. Chem., 1948, 176: 657-64, bibl. 17, being *Contr. Enzyme Res. Div. 115*.

k JENKINS, J. A.
The origin of the cultivated tomato.
Econ. Bot., 1948, 2: 379-92, bibl. 32, illus.
In South America.

l KENNEDY, W. K., AND UNRAU, J.
A rapid method for determining the oil content of safflower and sunflower seeds.
Agron. J., 1949, 41: 93-9, bibl. 3.

m KÖTTER, E.
Die Steigerung der Gemüseerträge in der Landwirtschaft durch zweckmässige Wahl geeigneter Kulturrefolgen. (Increasing vegetable yields on farms by the choice of suitable rotations.)
Ceres, Hamburg, 1949, 2: 2: 11-12.

n LAIBACH, F.
Wuchsstoffbildung und Kohlehydratstoffwechsel (nach Versuchen mit Gurkenkeimlingen). (Hormone production and carbohydrate metabolism [from experiments with cucumber seedlings].)
Reprinted from *Ber. dtsch. bot. Ges.*, 1941, 59: 257-71, bibl. 25 [received 1949].

o LEE, I. M.
California early potatoes. Situation and outlook, 1948.
Circ. Calif. agric. Exp. Stat. 390, 1948, pp. 30.

p MACVICAR, R., AND BURRIS, R. H.
Studies on nitrogen metabolism in tomato with use of isotopically labeled ammonium sulfate.
J. biol. Chem., 1948, 176: 511-16, bibl. 11.

q MINISTRY OF AGRICULTURE, LONDON.
Recommended grades for: (1) beetroot, parsnips, turnips and swedes, (2) broccoli and cauliflower, produced in England and Wales.
Market. Leaflets Minist. Agric. Lond. 102 and 103, 1948, pp. 4 and 4, 2d. each.

r MORRISON, H. E., AND OTHERS.
The effects of certain new soil insecticides on plants.
J. econ. Ent., 1948, 41: 374-8, bibl. 11.

s MÜLLER, K. O., AND BEHR, L.
"Mechanism" of *Phytophthora*-resistance of potatoes.
Nature, 1949, 163: 498-9.

t NAUDÉ, C. P.
The production of nicotine sulphate from waste tobacco [in S. Africa].
Fmg S. Afr., 1948, 23: 736, 750.
Summary of *Sci. Bull.* 278, *Div. chem. Serv.*, S. Afr.

u NIESCHLAG, F.
Das Dammannsche Erdtopfverfahren. (The use of the Dammann soil pot.)
Ceres, Hamburg, 1949, 2: 1: 15-16.
Further descriptions and illustrations. See *H.A.*, 19: 360.

v NYHLÉN, A.
Försök med sockerärter vid Nyckelby och några andra lokaler 1938-1947. (Trials with sugar peas at Nyckelby and other Swedish localities.) [English summary 1 p.]
Reprinted from *Årsskr. Lantbr. Trädgård-inst.*, 1948, pp. 303-34, bibl. 10, as *Medd. Trädgårdsförs. Malmö* 48.

w PATEL, G. A., AND BASU, A. C.
Bionomics of *Leucinodes orbonalis* Guen. (Lepidoptera) and *Epilachna* spp. (Coleoptera), the important pests of the brinjal, *Solanum melongena* L., in Bengal.
Proc. Zool. Soc. Bengal, 1948, 1: 117-29, bibl. 20.

x PERCIVAL, E. G. V., AND ROSS, A. G.
A colorimetric method for the estimation of alginic acid in seaweed specimens.
J. Soc. chem. Ind. Lond., 1948, 67: 420-1, bibl. 3.

y RANDHAWA, G. S., AND THOMPSON, H. C.
Growth and fruiting of tomato plants as influenced by growth-regulating substances applied to the soil.
Science, 1948, 108: 718-19, bibl. 6.

z REEVE, R. M.
Late embryogeny and histogenesis in *Pisum*.
Amer. J. Bot., 1948, 35: 591-602, bibl. 44, illus.

1403.

a ROMAGNOLI, M.
La coltivazione delle ramie nell'Azienda sperimentale del R. Istituto agronomico per l'Africa Italiana. (The cultivation of ramie at the experimental farm of the Royal Agricultural Institute of Italian Africa.)
Agric. colon., 1942, 36: 33-46, 74-82, 105-12, illus. [received 1948].
See also *H.A.*, 17: 1465.

b YAZICIOGLU, T.
Türkije'nin nebatı yağ zenginliği. (Oil-producing plants of Turkey.)
T.C. Yüksek Ziraat Enstitüsü, Ankara, 1945, No. 150, pp. 80, illus. [received 1948].

c SØRENSEN, H. (STATENS FORSØGSVIRKSOMHED I PLANTEKULTUR).
Stammegeførsø med Vinter-Rosenkaal 1944-1946. (Variety trials with late Brussels sprouts 1944-1946.)
Tidsskr. Planteavl., 1948 (?), 52: 223-35, being *Beretn. Statens Forsøgsvirks. Plante-kult.* 408.

d STODDARD, E. M., AND DIMOND, A. E.
Malachite green suppresses symptom expression of tobacco mosaic virus in tomato. Abstr. in *Phytopathology*, 1949, 39: 24.

e TOMETORP, G.
Sortförsök med sockerärter vid Alnarp 1943-1947. (Variety trials with sugar peas at Alnarp 1943-1947.) [English summary 2½ pp.]
Reprinted from *Årsskr. Lantbr. Trädgård-inst.*, 1948, pp. 253-302, bibl. 29, as *Medd. Trädgårdsförs. Malmö* 47.

f TRIGONA, G.

Primizie orticole e agricoltura intensiva in Tripolitania. (Early vegetable production in Tripolitania.)

Agric. colon., 1942, 36: 205-8, 246-51, 274-9 [received 1949].

Examples given and hopes expressed.

g UNITED STATES DEPARTMENT OF AGRICULTURE.

Plant material introduced by the division of plant exploration and introduction, Bureau of Plant Industry, October 1 to December 31, 1937 (nos. 124969 to 126493).

Plant Inventory U.S. Dep. Agric. 133, Washington, 1948, pp. 85.

Of particular interest to tomato breeders.

FLORICULTURE.

Flowers.

(See also 746-750, 772, 775, 778-784, 799, 1202, 1203, 1205, 1207, 1644.)

1404. EMSWELLER, S. L.

Breeding of ornamental plants.

Proc. Amer. Soc. hort. Sci., 1948, 51: 564-74, bibl. 20.

A general review of the tremendous field open to the breeder, incidentally indicating some of the problems or opportunities afforded by the following and other plants: *Antirrhinum*, *Matthiola incana*, carnations, chrysanthemums, lilies, dahlias and irises.

1405. CHADWICK, L. C., AND BRADLEY, K.

An experimental study of the effects of certain earthworms* on crop production.

Proc. Amer. Soc. hort. Sci., 1948, 51: 552-62, bibl. 11.

Experiments at Columbus, Ohio, concerned *Allobophora caliginosa* and *Eisenia* spp. earthworms regarding their effect on annual and perennial garden flower species. The authors sum up the results of these and other experiments neatly:—results indicate that earthworms will not persist in soil unless a high content of organic matter is maintained. If a high content of organic matter is maintained there seems little need of adding earthworms.

1406. SMITH, F. F., LUNG, P. H., AND FULTON, R. A.

Parathion in aerosols for the control of pests on greenhouse ornamentals.

(Mim. *Publ. U.S. Dep. Agric. Bur. Ent. Pl. Quar.* E-759, 1948, pp. 8, bibl. 6.

Parathion in aerosols was found highly toxic to a wide range of greenhouse insects and other pests in experiments at Beltsville, Md. The formula used in most of the experiments was: Parathion (technical 0,0-diethyl 0-p-nitrophenyl thiophosphate) 10, acetone 10 and methyl chloride 80 parts. The acetone and parathion were mixed before being introduced into the bomb. The pests included in the experiments are listed, together with a suggested schedule of treatment. The commended dosage of 10% parathion aerosol is 10 g. per 1,000 cubic feet of greenhouse space. Instructions and precautions as to its use are given.

1407. POST, K.

Weight grading of cut flowers.

Bull. N.Y. St. Flower Gr. 30, 1948, pp. 4-7, illus.

* See also 8270.

The advantages of some standard method of grading for cut flowers, that can be accurately applied and interpreted, are discussed in this article from Cornell University, and the system of weight grading is advocated as the best method of standardization. In general, where the weight of the flower is in the stem, a thick, long stem bears a large, good quality flower. Certain other specifications might have to be made in the case of some flowers; for snapdragons, for instance, it is suggested that weight per spike, minimum number of flowers per stem, and minimum stem length should be specified for each grade. Tentative grades are proposed for pompom chrysanthemums, snapdragons, irises, carnations and roses, and the points to be considered in the weight grading of these flowers are discussed. It is admitted that this system cannot take into account poor colour, crooked stems or misshapen flowers, but such specimens could be eliminated from the graded stock by the sorter.

1408. ROODENBURG, J. W. M.

Kunstlicht bij kasplanten. (Artificial light for greenhouse plants.)

Tuinbouw, 1948, 3: 258-60, illus.

A historical review of the introduction of artificial lighting into horticultural practice with particular reference to the production of out-of-season flowers, and a discussion on available methods, e.g. neon and fluorescent lighting.

1409. PERRA, P.

Le bouturage des plantes alpines. (Propagation of alpines by cuttings.)

Rev. hort. Paris, 1949, 121: 19-21, illus.

To prevent the wasteful and destructive practice of uprooting wild mountain plants and transplanting them intact into foreign surroundings, a practice that rarely results in survival, the author has established a method of propagation by cuttings, which, after many years trial, has proved successful for a great variety of alpines. The cuttings are taken at the end of August, and planted 5-6 to a pot in a closed and shaded frame until rooted. They are potted up singly in spring, and, with careful protection in cold frames, should be ready for planting out the following autumn. Among the wide range of plants for which this method, with slight variations, has proved successful are *Alyssum spinosum*, *Petrocallis pyrenaica*, *Silene acaulis*, *Dryas octopetala*, *Achillea tomentosa*, *Eritrichium nanum*, and several species of gentian.—Jardin Botanique, Lyon.

1410. P., J.
Impatiens sultani nana "Belle du Klettgau". (*Impatiens sultani nana* "Belle de Klettgau").
Rev. hort. suisse, 1949, 22: 42.

E. R.
 Ein Schweizer Zuchterfolg. (A Swiss breeding success.)
Gärtnermeister, 1948, 51: 414.

A new variety of *Impatiens sultani nana*, Schöne Klettgauerin, has been bred in Switzerland. It is easy to grow and its large (up to 4½ cm. diameter) flowers of a fiery scarlet red are reported to have a special lustre.

1411. HEYWOOD, V. H.
 A new *digitalis* (*Digitalis daviesiana*) from southern Anatolia.
J. roy. hort. Soc., 1949, 74: 164-5.

A botanical description of an attractive yellow-flowered species. It resembles *D. ambigua* but differs in its more indurated slender habit, narrower leaves of stiff leathery texture, and branched inflorescence.

1412. MANTEL, K.
 Cactussen. (Cactuses.)
Tuinbouw, 1948, 3: 314-16, illus.

A short account of their propagation, with notes on readily flowering species, illustrated with 6 fine photographs.

1413. KRAUS, G.
 Seltsames Auftreten von Kleeseide an Zierpflanzen. (The unusual occurrence of dodder on ornamental plants.) [English summary ½ p.]
PflSchutz Ber., 1948, 2: 186-90, bibl. 7.

A severe infestation of *Petunia hybrida* with *Cuscuta racemosa* var. *nuda* occurred suddenly in a glasshouse of the horticultural and viticultural institute at Klosterneuberg near Vienna. Later, the presence of the parasite was established on a number of other ornamental plants and weeds. It is assumed that the compost soil used contained the dodder seed.

1414. LACEY, M. S.
 Studies on *Bacterium fascians*. V. Further observations on the pathological and physiological reactions of *Bact. fascians*.
Ann. appl. Biol., 1948, 35: 572-81.

Seedlings (sweet pea and French bean) were treated with cell-free filtrates of cultures of *Bacterium fascians* (H.A., 12: 438), *B. tumefaciens* and other bacteria, and the effects on growth noted and compared with malformations resulting from the inoculation of living bacteria. An account is given of the production and destruction of β -indoleacetic acid and other growth-promoting substances by *B. fascians* and other bacteria.—Imp. Coll. of Sci. and Tech., London.

1415. SEVERIN, H. H. P., AND TOMPKINS, C. M.
 Aphid transmission of mild mosaic virus of annual stock.
Hilgardia, 1948, 18: 539-47, bibl. 8, illus.

Five species of aphid were shown to be vectors of mild-mosaic virus of annual stock (*Matthiola incana* var. *annua*) in California. Of those, only one, the turnip aphid (*Rhopalosiphum pseudobrassicae*), breeds on annual stock plants under natural conditions.

1416. MUSSENBROCK, A., AND BEACH, G.
 Cost comparisons—soil and gravel-grown carnations.
Proc. Amer. Soc. hort. Sci., 1948, 51: 623-6.

Trials at Fort Collins, Colo., showed that as regards operating costs only gravel-grown carnations were less expensive per length of bench than soil-grown.

1417. PUSSARD, R.
 Précisions sur l'emploi des insecticides de synthèse appliqués aux parties aériennes de l'oeillet cultivé. (Applying synthetic insecticides to the aerial organs of carnation.)
C.R. Acad. Agric. Fr., 1948, 34: 998-1001.

Continuing his work on the use of synthetic insecticides against carnation pests (H.A., 17: 904) the author now recommends: HCH applied as a powder against thrips applied fortnightly and two applications of SNP in April at an 8- or 10-days interval against tortrix moth (*Cacoecia pronubana*) and red spider (*Tetranychus telarius*).

1418. SCHAEFER, E. E.
 Rhizoctonia stem-rot of carnations [in S. Africa].
Fmg S. Afr., 1948, 23: 742-3.

Causes serious loss of plants in the Transvaal. A popular description of the disease is followed by advice on how to keep plants healthy.

1419. PUSSARD, R.
 Influence de quelques insecticides de synthèse incorporés dans le sol sur la végétation de l'oeillet cultivé. (The effect of soil applications of organic insecticides on carnations.)
C.R. Acad. Agric. Fr., 1948, 34: 1001-4.

Carnations which benefit from applications of low concentrations of HCH to their aerial parts can withstand relatively high concentrations when incorporated into the soil. Toxicity is not noticeable until the applications reach 100 kilos per hectare.

1420. ANON.
 Nebraska introduces new chrysanthemums.
Amer. Nurserym., 1949, 89: 2: 41-2.

A description is given of 3 new varieties of chrysanthemum, all Lieutenant Beckner seedlings, introduced by the University of Nebraska. They are called Santee, Pearl Parkinson and Ponca, and are autumn-flowering, outdoor varieties. The plants stand the winter well.

1421. POST, K.
 Year around flowering of chrysanthemums.
Bull. N.Y. St. Flower Gr. 39, 1948, pp. 2-6.

A diagrammatic schedule for an all-the-year-round production of chrysanthemums has been worked out at Cornell University on the basis of photoperiodic control. A study of growth rates showed that the time required from the beginning of short-day treatment to flowering was nearly constant for each variety throughout the year.

1422. POST, K.
 Temperature and chrysanthemum flower development.
Bull. N.Y. St. Flower Gr. 30, 1948, pp. 3-8, illus.

Trials conducted at Cornell University, in which

5 chrysanthemum varieties were grown at temperatures of 50° F. and 60° F., established certain guiding principles in the choice of the best temperature for the production of high quality blooms. The colour of pink and bronze varieties is better when flowers open at 50° F. The number of flowers per spray is greater, and the form of spray better, at 60° F. Varieties in which the centre florets tend to develop imperfectly should be kept at 50° F. during the last 3 weeks before flowering, especially from September to March. Varieties which have an undesirable tendency to produce reflexed petals should also be allowed to develop at a low temperature.

1423. STEVENSON, J. B.

Early flowering chrysanthemums.

J. roy. hort. Soc., 1949, 74: 165-9.

Notes on cultivation, with special emphasis on the correct method of propagation from cuttings. A selection of varieties is given which will flower in southern England throughout August and September.

1424. STUART, N. W.

Growing chrysanthemums in subirrigated vermiculite for spring bloom.

Proc. Amer. Soc. hort. Sci., 1948, 51: 593-5, bibl. 3.

In trials at Beltsville, Md, expanded vermiculite proved a very satisfactory soilless culture medium for rapid and good plant growth.

1425. POST, K.

Day length and flower bud development in chrysanthemums.

Proc. Amer. Soc. hort. Sci., 1948, 51: 590-2, bibl. 2.

Observations at Ithaca, N. York, show that chrysanthemum flower buds are initiated when the daily light period is 14 to 14.5 hours but that most rapid flower bud development does not occur until the light period is 13 to 13.5 hours.

1426. POST, K.

Marginal lighting for identifying chrysanthemum stunt.

Bull. N.Y. St. Flower Gr. 31, 1948, pp. 3-5, illus.

By controlling the day length of chrysanthemum plants it is possible to detect stock plants affected by stunt within 6-8 weeks, which is a great advantage in propagating. It was shown at Cornell University that an hour of light given in the middle of the night, or 2 hours given from 7 to 9 p.m., was sufficient to prevent flowering in healthy plants, but allowed affected plants to flower freely. During long days the same effect was obtained by reducing the light period to give 10 hours of darkness. Suggestions are made for the most satisfactory way of doing this.

1427. QUISUMBING, E.

Studies on *Phalaenopsis*, III.*Philipp. J. Sci.*, 1947, 77: 1-18, bibl. 11, illus. [received 1949].

This is the third in a series of studies on Philippine species of *Phalaenopsis*, sections *Zebrinae* and *Stauroglottis*. It covers the following orchid species: *P.*

equestris, *P. lindenii*, *P. lueddemanniana*, *P. mariae*, and *P. micholitzii*.

1428. MEYER, J. R., AND PELLOUX, A.

Ação estimulante de dois hormônios de crescimento vegetal sobre germinação de sementes e desenvolvimento de seedlings de orquídeas em meio assimbiótico. (The stimulating effect of 2 plant growth hormones on the germination of seeds and development of seedlings of orchids in symbiotic culture.)

O Biológico, 1948, 14: 151-61, bibl. 10, illus.

It was found at the Biological Institute, São Paulo, Brazil, that the addition of 1 p.p.m. α -naphthaleneacetic acid or γ -indolebutyric acid to the nutrient solution had a markedly stimulating effect on the germination of seeds of *Cattleya warneri*, and on the growth of *Dendrobium* seedlings. Higher concentration (10 p.p.m.) resulted in the death of seeds of several species. Seedlings from 3-12 months old, however, developed stronger root systems and larger leaves in this higher concentration, young seedlings responding more readily than those older than 10 months.

Bulbs.

(See also 732, 1644, 1670.)

1429. EMSWELLER, S. L., AND STUART, N. W.

Use of growth regulating substances to overcome incompatibilities in *Lilium*.*Proc. Amer. Soc. hort. Sci.*, 1948, 51: 581-9, bibl. 13.

The results presented in this paper indicate that hormone treatment of lily ovaries at time of pollinations makes it possible to achieve some difficult crosses and overcomes some self-incompatibilities. It is also shown that the treatment delays abscission of the style, increases sugars in the young developing fruit and stimulates its growth. The action of pollen + hormone is shown to be greater than that of either one alone, but is not completely additive in effect. [From authors' summary.]

1430. EMSWELLER, S. L.

Colchicine-induced polyploidy in *Lilium longiflorum*.*Amer. J. Bot.*, 1949, 36: 135-44, bibl. 20, illus.

Polyploids of 12 species and 2 species hybrids of *Lilium* were obtained by soaking the lily scales in colchicine solutions for various periods of time. The most effective concentration of colchicine was 0.2%. This paper deals with cytological observations as well as additional morphological studies of some of the *L. longiflorum* polyploids.—Bureau of Plant Industry, Beltsville, Md.

1431. SMITH, F. F., AND BRIERLEY, P.

Simulation of lily rosette symptoms by feeding injury of the foxglove aphid.

Phytopathology, 1948, 38: 849-51, illus.

The foxglove aphid, *Myzus convolvuli*, is not a vector of either lily rosette virus or lily mottle virus, but its feeding injuries simulate the symptoms of both virus diseases.—Maryland Agricultural Research Centre.

1432. BEYER, J. J.

Bloeimogelijkheden van bloembollen op het Zuidelijk Halfmond. (The blossoming possibilities of flower bulbs in the southern hemisphere.)

Tuinbouw, 1948, 3: 317-20, illus.

The author discusses the difficulties associated with the acclimatization of bulbous flowering plants exported from the northern to the southern hemisphere, owing to the difference in seasons in the two regions. Bulbs exported at the end of the growing season arrive at their destination in the spring in their new surroundings, and some treatment is necessary. Three methods are mentioned: (1) The acclimatization method.—The bulbs are despatched in the normal season (October and November) and on their arrival, about a month later, they are planted as soon as possible in a cool, shady place. Owing to the warm weather flowering fails but leaves are produced, and the plants will gradually become acclimatized to their new surroundings. (2) Cool house planting.—The bulbs on arrival are kept for a while under normal outdoor conditions of relatively high temperature until roots develop. The bulbs are then kept at 0°-5° C. for some weeks, after which they are brought into the open to flower from April to July. (3) Retarding method.—The bulbs are despatched so as to arrive at their destination at the beginning of winter there. The subsequent treatment varies somewhat with the species and notes are given for the special treatments recommended for hyacinths, narcissi, and tulips.

1433. FAASE, J. G.

De invloed van de temperatuur op het bloeivermogen van de hyacint. (The influence of temperature on the blooming of hyacinths.)

Tuinbouw, 1949, 4: 16-17.

The effect of changes in temperature on hyacinths, with particular reference to the preparation of the bulbs for export to the southern hemisphere, where the seasons are 6 months later than in the northern hemisphere. Various methods have been tried to obviate the difficulties associated with this seasonal change. Recent research at Lisse shows that good results can be obtained by storing the bulbs, after they are taken up and until the middle of October, at a temperature of 30° C. and then at -1° C. until the end of December. At the beginning of January the temperature applied is 25½° C. which is maintained for 6 to 10 weeks until the bulbs are exported, about the beginning of March.

1434. ANON.

De goede voorbehandeling van onze tulpenbollen ter verkrijging van een goede en vroege bloei. (Pretreatment of tulip bulbs for forcing.)

Meded. RijksstuinbCons. Z.H. Glasd., 1948, 12: 47-8.

With tulips, flower differentiation occurs in the bulb after lifting. As there are 7 stages in the flower development, for each of which there is an optimum temperature, pretreatment of bulbs for forcing must be carefully controlled. After lifting, the bulbs should be kept dry and at a temperature of 20° C. for 3-4 weeks, until the differentiation of the stamens has begun. They should then be transferred to a cold store at 9° C.

for about 6 weeks, during which time (mid-September) they are planted in boxes. When the bulbs break through, the temperature is raised to 13° C., and when they are 3 in. high they are brought into a greenhouse at 17° C. Forcing should not begin, nor should light be admitted, until the bulbs are 6 in. high. Varieties suitable for very early forcing are the Mendel tulips, Superba, Hillegarda, Krelage's Triumph, Heraut, v.d. Eerde, and White Sail.

1435. EVENARI, M., KONIS, E., AND ZIRKIN, D.

Forced early flowering of *Iris* bulbs and the prolongation of their flowering period.

Palest. J. Bot. (J.), 1947, 4: 109-11, bibl. 3.

It has been found possible in Palestine to advance the flowering period of *Iris* bulbs by pre-cooling them for 30 days at a temperature of 4° C. This treatment is most effective in combination with early planting. The same treatment results in a pronounced prolongation of the flowering period.

1436. WASSCHER, J.

Het gebruik van genummerde potten bij de zaadteelt van cyclamen. (The use of numbered pots for cyclamen intended for seed production.) [English summary 9 ll.]

Meded. Dир. Tuinb., 1949, 12: 79-81.

In order to avoid confusion of varieties owing to colour variation, the members of the N.A.K.S. (General Netherlands Inspection Service for Ornamental Plants) Cyclamen Section, are now required to apply the system of numbered pots on their holdings.

1437. MAGIE, R. O., AND KELSHIMER, E. G.

Control of thrips and other insects on gladiolus.

Press Bull. Fla agric. Exp. Stat. 634, 1947, pp. 4.

The gladiolus thrips, *Taeniothrips simplex* (Morison), is briefly described. On heavily infested test plots 10 days and again 3 days before flower spikes were ready to cut, DDT was applied to the plants with a knapsack sprayer, using 2 lb. 50% wettable powder in 100 gal. water and a cupful of spreader. The thrips were killed and the blossoms developed free of thrips injury.

1438. BOIS, E., AND BARBEY, P.

Rapport sur quelques dahlias nouveaux. (A report on some new dahlias.)

Rev. hort. suisse, 1949, 22: 11-15.

Parallel trials of new dahlia varieties, most of them French, were carried out by the Geneva town council and the École d'horticulture de Châtelaine, as the result of which 27 varieties were selected as the most satisfactory. Their characteristics are briefly described in tabulated form. It is obvious that fashion has abandoned the large-sized flower and that the trend is now towards medium size. Special attention is drawn to the variety Mlle Georgette Hénin.

1439. BODMER, H.

Nouveautés de dahlias français 1945-1948.

(New French dahlias 1945-1948.)

Rev. hort. suisse, 1948, 21: 329-31.

A brief description of 18 new French dahlia varieties exhibited at Angers in September 1948, with 3 illustrations.

*Shrubs.**(See also 997, 1656.)*

1440. MYHRE, A. S., AND SCHWARTZ, C. D.
Rooting evergreen cuttings with hormones.
Proc. Amer. Soc. hort. Sci., 1948, 51: 639-50, bibl. 7.

Experiments at Puyallup, Wash., with cuttings of arborvitae, cypresses, hollies, junipers, yews and other evergreens, using mainly indolebutyric acid. *Taxus baccata aurea* responded better to naphthaleneacetic acid. Powders were not so good as liquids in these trials.

1441. O'ROURKE, F. L., AND MAXON, M. A.
Effect of particle size of vermiculite media on the rooting of cuttings.
Proc. Amer. Soc. hort. Sci., 1948, 51: 654-6, bibl. 2.

No. 2 size particle grade of vermiculite with an average diameter of 2 to 3 mm. proved satisfactory for a number of ornamental shrubs and flowers.—East Lansing, Mich.

1442. PRIDHAM, A. M. S.
Comparison of quartz sand, cinders and vermiculite in rooting of evergreen cuttings.
Proc. Amer. Soc. hort. Sci., 1948, 51: 657-8.

Little difference in results was experienced in different media with *Juniperus chinensis pfitzeriana* and *Thuja orientalis*.

1443. CHADWICK, L. C., AND HOUSTON, R.
A preliminary report on the pre-storage defoliation of some trees and shrubs.
Proc. Amer. Soc. hort. Sci., 1948, 51: 659-67, bibl. 2.

Data are given on the use of certain chemicals for the defoliation of shrubs prior to shipping or transport. Nacconol NR plus a summer oil proved particularly successful. Strengths of solution and effects are discussed. The substance is stated to be "sodium salts of alylated benzene sulfonic acid".

1444. LITTLE, E. L., Jr.
Layering after a heavy snowstorm in Maryland.
Ecology, 1944, 25: 112-13, bibl. 4 [received 1949].

An account of the natural layering that occurred in the Beltsville Experimental Forest, from the tops and branches of trees damaged in a snowstorm. *Viburnum pubescens*, *Clethra alnifolia*, and *Cornus florida* were observed to layer very readily, whereas in *Juniperus virginiana*, *Liquidambar styraciflua*, *Pinus rigida*, *P. virginiana* and several species of *Quercus* (among others) layering did not occur. It is suggested that frequency of natural layering is related to the ease with which cuttings can be rooted.

1445. RUSSELL, J. P. C.
Hardy evergreen azaleas for the garden.
J. roy. hort. Soc., 1949, 74: 144-53, illus.

A description of these plants, the merits of which are extolled. Lists are given of species, colour forms, and hybrids.

1446. FORET, J., AND VOLZ, E. C.

The effects of certain fertilizers and potting media on the growth and flowering of azaleas.
Proc. Amer. Soc. hort. Sci., 1948, 51: 633-8, bibl. 8.

In this paper and in that by Ballhorn and Volz [see 1459 a] the pH and fertilizers and peat media most suitable for growing azaleas are discussed at some length.—Ames, Ia.

1447. GILL, D. L.

Azalea petal blight and its control.

Flor. Exch., 1948, 111: 21: 14-15, bibl. 5.

Azalea petal blight, caused by *Ovulinia azalea*, is first seen as small white spots on the petals. This is followed by limpness of flowers. Spraying the flowers three times a week with a fine mist or fog or with dust of Dithane Z-78 or Parzate proves a satisfactory control.

1448. JACOBI, E. F., WOUDENBERG, J. P. M., AND KRAMER, C.

Onderzoek naar de werking van de winterbedekking van rhododendrons. (Winter protection for rhododendrons.)

Meded. Dir. Tuinb., 1948, 11: 713-20.

A trial for the protection in winter of frost-susceptible rhododendrons is described. Various meteorological conditions are recorded. It is concluded that shelter, by laths or reed-matting, even in rather mild winters, is good.

1449. DE BOER, S.

De invloed van koud en warm water, groeistoffen en aethyleenchlorhydrine op het enten van rhododendron. (The influence of cold and hot water, growth substances and ethylene chlorhydrin on rhododendron grafts.)

Meded. dendrol. Veren. Jaarb., 1947, 16: 110-15, illus., being *Meded. "de Proeftuin te Boskoop* 3b.

This work is a continuation of that started by Kruyt at the Trial Gardens, Boskoop, on rhododendron grafts. Scions of hybrids known to callus with difficulty were immersed before grafting in cold and warm water, in combination with β -indoleacetic acid, β -indolebutyric acid, α -naphthaleneacetic acid, and ethylene chlorhydrin. Very little improvement in callusing was observed, and none of the treatments is recommended. Warm water treatment often damaged the leaves.

1450. SEELEY, J. G.

Soil nitrate levels for roses.

Bull. N.Y. St. Flower Gr. 37, 1948, pp. 2-4, illus.

SEELEY, J. G., AND POST, K.

Soil nitrate levels for roses.

Proc. Amer. Soc. hort. Sci., 1948, 51: 613-17, bibl. 5.

Results of a series of experiments obtained over 8 years at Cornell University indicate that the best production and stem length of roses under glass occurs when the nitrogen level of the soil is maintained between 25 and 100 p.p.m. all the year round. The amount of nitrogen applied is in this way controlled by the amount used

by the plants, thus less fertilizer is required to maintain the optimum level in winter than during the summer.

1451. HOFFMAN, J. R.

Hexaethyl tetraphosphate and tetraethyl pyrophosphate as aerosols against the two-spotted spider mite.

J. econ. Ent., 1948, 41: 356-62.

The mite *Tetranychus bimaculatus* was chosen for these tests because of its economic importance to rose growers. The optimum dose of hexaethyl tetraphosphate and tetraethyl pyrophosphate, used as an aerosol, was determined. The latter material gave a higher kill, and curves confirmed that the toxicity of HETP is related to its TEPP content.—Cornell University.

1452. DE BOER, S.

Het stekken van acer. (Propagation of *Acer* by cuttings.)

Nederl. dendrol. Veren. Jaarb., 1947, 16e, pp. 116-18, being *Meded. "de Proeftuin"* te Boskoop 4.

In view of the scarcity of material of *Acer palmatum*, the species used as stock for many named varieties of maple, trials were carried out at Boskoop to find the best method of propagating these varieties by cuttings. It was found that the right time for propagation, and the right growth substance and concentration, had to be determined for each variety separately. 0.1% naphthaleneacetic acid gave good results with *A. palmatum dissectum* types. A compost of 2 parts peat moss: 1 part sand was found to give better results than the traditional one containing a high proportion of sand. The overwintering of cuttings proved difficult.

1453. MENTZER, C.

Action favorable de l'acide α -naphthaleneacétique sur l'enracinement et la croissance des boutures de platane (*Platanus orientalis* var. *acerifolia* Willd.). (Alpha naphthaleneacetic acid helps rooting and growth of plane cuttings.)

C.R. Acad. Agric. Fr., 1948, 34: 983-6, bibl. 4.

Alpha-naphthaleneacetic acid at a concentration of 17 p.p.m. has a favourable effect on the rooting and survival of cuttings of *Platanus orientalis* var. *acerifolia*, but the results are irregular and depend, in some degree, on the climatic and soil conditions under which the application is made.

1454. KERR, T. W., Jr.

A *Phyllobius* species, a new pest and its control on arborvitae.

J. econ. Ent., 1948, 41: 331-2.

An undetermined species of *Phyllobius*, that feeds on roots of *Thuja*, *Chamaecyparis*, and *Juniperus*, is reported from Rhode Island. DDT and benzene hexachloride will give effective control.

1455. TOOLE, E. R., AND HEFTING, G. H.

Selection and propagation of *Albizia* for resistance to *Fusarium* wilt.

Phytopathology, 1949, 39: 63-70.

A destructive disease of the mimosa tree (*Albizia julibrissin* Durazz.) is a vascular wilt caused by *Fusarium*

oxysporum f. *perniciosum*. Other methods of control having failed, attempts have been made to discover and propagate wilt-resistant mimosa. Out of 1,437 seedlings tested by root inoculation 20 have survived for 8 years. Experiments showed that root cuttings gave better rooting than stem cuttings, hardwood than greenwood cuttings, the propagating box than the greenhouse bench, and no storage than pre-storage of cuttings in moist sand.—Forest Experiment Station, N. Carolina.

1456. THIELKE, C.

Beiträge zur Entwicklungsgeschichte und zur Physiologie panaschierter Blätter. (Development and physiology of variegated leaves.)

Planta, 1948, 36: 2-33, bibl. 19.

(1) The variegated strain of *Filipendula ulmaria* investigated was shown to be a periclinal chimaera of the type *albocordatus*. The same proved to be true for the *Pelargonium* variety Freak of Nature and for *Sambucus nigra albocinerea*. (2) In the monocotyledons examined, *Chlorophytum*, *Funkia* and *Dracaena*, the abnormal tissues in the leaf margin are formed by the epidermis on the growing point during the first developmental stages of the leaf primordium. (3) Although the colourless leaf margins of *Sansevieria zeylanica* var. *laurentii* are not normally capable of giving rise to roots, they were found to produce roots and shoots following the application of heteroauxin paste. (4) Darkness and low temperature did not reduce variegation in *Tradescantia albiflora* var. *albo-vittata*.—Histological details are given for all the plants mentioned.—Jena University.

Lawns.

1457. WOODSIDE, A. M.

DDT for ant control in lawns.

J. econ. Ent., 1948, 41: 325-6.

Brief experiments indicate that DDT, in lighter applications than are commonly used for Japanese beetle control, will satisfactorily control ants in lawns. Applications of 2.45 lb. 10% DDT per 1,000 sq. feet (=1 g. per sq. yard) gave complete control in 5 weeks. Dusts and sprays are equally effective, but sprays gave slightly quicker results.

1458. SCHREAD, J. C.

Control of soil insects.

J. econ. Ent., 1948, 41: 318-24, bibl. 2.

A comparison is made of the effect of DDT, benzene hexachloride, parathion, chlordan and chlorinated camphene in the control of certain soil pests. The ant, *Lasiurus niger*, var. *americanus*, frequently a nuisance in turf, was successfully eliminated by an application of chlordan at 4 oz. of 50% wettable powder to 1,000 sq. feet of turf.—Connecticut agric. Exp. Stat., New Haven.

Noted.

1459.

a BALLHORN, R. D., AND VOLZ, E. C.

The influence of soil acidifying techniques on the growth of azaleas.

Proc. Amer. Soc. hort. Sci., 1948, 51: 627-32, bibl. 6.

b BARRETT, J. T.
A leaf and twig blight of California laurel,
Umbellularia californica Nutt.
Abstr. in *Phytopathology*, 1948, 38: 912.
Caused by a species of *Macrophoma*.

c BUTTERFIELD, H. M.
Rose culture in California.
Circ. Calif. agric. Ext. Serv. 148, 1948,
pp. 39, bibl. 10, illus.
Culture, varieties, hygiene.

d CHAPUIS, R.
Le nouveau dahlia nain: "Alfred Goy".
(The new dwarf dahlia, Alfred Goy.)
Rev. hort. suisse, 1949, 22: 83-4.

e CHEVALIER, A.
Sur un flamboyant à fleurs jaune d'or.
(A flamboyant with golden yellow flowers.)
Rev. int. Bot. Appl., 1947, 27: 318, bibl. 1.

f CSIZIK, A.
Classificatie van dahlia's volgens het
nederlandse systeem. (Dahlia classification
by the Dutch system.)
Tuinbouw, 1948, 3: 261-5, illus.

g JEHLE, R. A., AND JENKINS, A. E.
Cases of scab [*Sphaceloma violae* Jenkins]
on violet and pansy in Maryland.
Phytopathology, 1948, 38: 925-8, bibl. 11,
illus.

h KIRCHHEIMER, F.
Über die Fachverhältnisse der Früchte
von *Cornus* L. und verwandter Gattungen.
(The compartments of *Cornus* L. fruits
and those of related genera.)
Planta, 1948, 36: 85-102, bibl. 32.

i LAURIE, A., AND DUFFY, J.
Anatomical studies of the abscission of
gardenia buds.
Proc. Amer. Soc. hort. Sci., 1948, 51:
575-80, bibl. 1.

j MONTELARO, J., AND PLAKIDAS, A. G.
Production of Easter lily bulbs in Louisiana.
Bull. La agric. mech. Coll. Div. agric. Ext.
No. II, date ?, pp. 16 illus., [received 1949],
All aspects of cultivation.

k RILEY, H. K., AND DAIGLE, C. J.
Spray tests for azalea petal blight.
Proc. Amer. Soc. hort. Sci., 1948, 51:
651-3.
Dithane most effective.—Lafayette, La.

l RILEY, H. P.
Chromosome studies in a hybrid between
gasteria and aloe.
Amer. J. Bot., 1948, 35: 645-50, bibl. 9,
illus.

SUB-TROPICAL CROPS.

General.

1460. SCHROEDER, C. A.
Report of the Committee on Subtropical
Fruit Varieties [in S. California].
Yearb. Calif. Avocado Soc. for 1948,
pp. 17-19.

Among the fruits and nuts having commercial possibilities which are recommended for small-scale planting in Southern California are the cherimoya, macadamia, and white sapote. The cultivation of such fruits as the mango, litchi, papaw, and other tender subtropicals must await the development, or discovery, of varieties better suited to Californian conditions.

1461. LAL, K. B.
Plant protection service in the United
Provinces [India].
Indian Fmg., 1948, 9: 493-6, illus.

An account of the first plant protection service to be set up by provincial or state governments in India. Other governments contemplating the setting up of similar services might profit by this account of experience in the United Provinces.

1462. FARIA DA FONSECA, V.
A economia agrícola na Chibia. (The
agricultural economy of Chibia [Angola].)
Agron. angol., 1948, 1: 81-116.

Dealing with the horticultural economy of the district, the author makes an analysis of the production costs and profits arising from 1 hectare of ground cropped according to a common rotation of brassicas, beans, peas, turnips, and potatoes, taking an average of prices over the last 5 years. The economy of the four main

crops, oranges, tangerines, mangoes and papaws, is analysed in the same way. From a study of local conditions, he concludes that cultivation of the plateaux could be mechanized with great advantage, and that irrigation of at least part of every holding would give the grower greater economic security.

Avocado.

1463. GRISWOLD, H. B.
Committee on foreign exploration [for
avocados].
Yearb. Calif. Avocado Soc. for 1948,
pp. 69-70.

Includes information on the wild and edible forms of avocados recently introduced into California—the former for rootstock trials.

1464. WHITE, A.
Steps in the solution of avocado problems.
Yearb. Calif. Avocado Soc. for 1948,
pp. 131-4.

Refers to the Santa Barbara County of California. Experiments in progress cover: variety trials, control of root rot disease, irrigation, manuring, replanting in established orchards, management of crowded orchards, tree spacing, and rootstocks. Advice is given on how to deal with root rot problems.

1465. AVERRETT, W. E.
When is the time to tree thin the Avocado
groves?
Yearb. Calif. Avocado Soc. for 1948,
pp. 118-21, illus.

The problem is considered during three phases extending over 15-18 years.

1466. JOHNSTON, J. C.

Frost protection [for avocados].

Yearb. Calif. Avocado Soc. for 1948, pp. 122-4.

Some protection is achieved by keeping the soil bare and firm, and, in the case of young trees, by wrapping the trunk and main limbs. Orchard heaters provide the most dependable protection. Wind machines give limited protection.

1467. BARRETT, C.

Annual Report of the Sub-Committee on Avocado rootstocks, June, 1948.

Yearb. Calif. Avocado Soc. for 1948, 14-17.

A form of registration for seedling rootstocks is included.

1468. HALMA, F. F., AND WHITE, F. A.

Avocado rootstock trials in Santa Barbara county.

Yearb. Calif. Avocado Soc. for 1948, pp. 103-7, bibl. 1, illus.

A brief account of trials laid down in recent years.

1469. CONOVER, R. A.

A seedling blight of avocado caused by *Phytophthora palmivora*.

Phytopathology, 1948, 38: 1032-4.

Seedling avocados severely attacked by *Phytophthora palmivora* were unfit for use as rootstocks. All the aerial parts of the plants were attacked to some degree, as well as scions of plants already grafted.—University of Florida.

1470. ZENTMYER, G. A., AND KLOTZ, L. J.

Avocado root rot.

Yearb. Calif. Avocado Soc. for 1948, pp. 74-5, reprinted from Calif. Agric., June 1948.

Two factors appear to be involved in typical avocado root rot, the fungus *Phytophthora cinnamomi* and high water-content of the soil. Short descriptions are given of soil fumigation experiments and studies of diseased trees. Of the varieties tested, those from Guatemala were more susceptible to injury by *P. cinnamomi* and water-logging than the Mexican varieties, Mexicola, Ganter, Puebla, Harmon, and Topa-Topa.

1471. ZENTMYER, G. A.

Verticillium wilt of avocado.

Yearb. Calif. Avocado Soc. for 1948, pp. 83-7, bibl. 6, illus.

A disease of avocado trees in California involving sudden wilting and collapse of the leaves has been identified as caused by *Verticillium albo-atrum* Reink. and Berth. Trees are usually not killed entirely and often make excellent recovery. Trees on both Mexican and Guatemalan rootstocks are affected; the disease is present in all the commercially producing avocado districts in Southern California. Seedlings showed disease symptoms in twelve days at soil temperatures of 20°, 25° and 30° C. following dipping the roots in a suspension of spores and mycelium. [Author's summary.] [Noted also in *Phytopathology*, 1949, 39: 26.]

Citrus.

(See also 751, 880, 1089, 1691.)

1472. LOMBARD, C. A.

The cultivation of citrus orchards in the Eastern Cape Coastal area [of S. Africa].

Citrus Gr, 1948, No. 179, pp. 6-8.

An advisory article based mainly on field observations.

1473. TRIGONA, G.

L'agrumicoltura in Tripolitania. (Citrus growing in Tripolitania.)

Agric. colon., 1942, 36: 124-34, 162-6, illus.

[received 1949].

Citrus growing in its early days, capable of development in ways which are discussed.

1474. MCALPIN, D. M., AND ROLFE, W. A.

Lemon growing in Victoria.

J. Dep. Agric. Vict., 1948, 46: 433-41.

The commercial area under lemons in Victoria is 1,400 acres with an average production of 150,000 bushels per year, and home-garden lemon trees occupy about 600 acres. Eureka and Lisbon are the main varieties grown. In southern Victoria, strains of Lisbon, less thorny than the normal type, have been developed by careful bud selection over many years by the pioneer growers. The rootstocks used for lemon trees in Victoria include citronella (rough lemon, *Citrus limon*) 45%; sweet orange (*C. sinensis*) 25%, sour orange (Rough Seville, *C. aurantium*) 25%, and, to a small extent, trifoliata (*Poncirus trifoliata*) and common lemon (*C. limon*), and in still smaller numbers, citron, shaddock, and mandarin. The characters of the chief rootstocks are outlined. Windbreaks are often necessary and should be planted 8 to 10 ft. apart. Pine (*Pinus radiata*), cypress (*Cupressus lambertiana horizontalis*), almonds and tree lucerne (*Tagasaste*) are most commonly used. Advice is given on planting methods and distances, drainage, cultivation, nutrition (with mention of deficiency disorders), irrigation, pruning, harvesting and marketing.

1475. ANON.

Orange-growing on Raoul Island.

Orchard. N.Z., 1948, 21: 8: 5.

It is stated that Raoul, or Sunday Island, in the Kermaidec Group, 600 miles north-east of Auckland, has unusual possibilities as a prospective source of citrus and other fruit supplies for the New Zealand market. The soil is rich and well balanced. The climate is excellent, the rainfall being 60 in. a year and the temperature ranging from 50° to 60° F. Most of the diseases and pests encountered in other parts of the world are absent. Frost is unknown and irrigation is unnecessary. The island is outside the hurricane belt and there is ample shelter for plantations.

1476. CHEVALIER, A.

Récents progrès de la citriculture en Guinée française. (Recent progress in citrus growing in French Guinea.)

Rev. int. Bot. appl., 1947, 27: 257-64, bibl. 5.

A review of past experience with notes on recent progress recorded during a visit in 1947. It is estimated that about 700,000 orange trees [seedlings?] are

grown by Africans and 300,000 grafted trees (2,000 ha.) by European planters.

1477. VINOT, M., AND BOUSCARY, A.

Le pamplemoussier dans le midi de la France. (Grapefruit growing in the south of France.)

Ann. agron. Paris, 1948, 18: 570-88, bibl. 15, illus.

A discussion of the requirements of grapefruit and a study of locally-grown varieties shows that the cultivation of the crop on the Côte d'Azur could be usefully expanded, especially on good soils not suitable for flower growing.—Stat. Bot. et Pathol. végét., Antibes.

1478. HERRERO DE EGAÑO, M., AND PEÑASCO CAMACHO, T. M.

Los suelos del naranjo en el término de Alcira. (The orange growing soils around Alcira.) [Summary in French and English.] *Bol. Inst. nac. Invest. agron. Madrid*, 1948, 18: 141-80, bibl. 5.

The types of soil around Alcira (Valencia) are described, and their distribution indicated on a map, in relation to orange-growing in that district. Oranges of low quality are produced on the "loam" (corresponding to Nos. 11 and 12 of Kopecky's classification) of the lower parts of the area. Those of fine quality are grown in the sandy soil of the valleys between the mountains which is irrigated by mountain streams. On the sandy soils the fruits are larger, have thinner peel, and more juice and sugar than those on the heavier soils.—Estación Naranjera de Levante, Burjasot (Valencia).

1479. SWINGLE, W. T.

New taxonomic technique in studying wild relatives of major crop plants illustrated by citrus.

Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 798.

An improvement of the technique discovered by Juel (1918) for restoring herbarium material has made it possible to make permanent serial microtome sections of such material on a very large scale. This technique is being used by the office of Plant Exploration and Introduction, U.S.D.A., for the study of wild citrus species in their rootstock investigations.

1480. ARCHIOVSKAJA, E. V., AND RUBIN, B. A.

On the variations in respiratory activity of citrus fruits during their development.

[Russian.]

Dokl. Akad. Nauk. S.S.R., 1949, 64: 215-17, bibl. 10.

A study of the part played in the respiration of citrus fruit tissues of two groups of oxidases, those containing heavy metals (labile to the action of cyanide), and oxidases providing the so-called residual respiration not affected by cyanide. The effect of KCN on tissue respiration was investigated by infiltrating tissues of citrus fruits with 0.01 M solution of KCN, controls being infiltrated with distilled water. It was found that during the life cycle of the fruit the role of the oxidases varied considerably. Graphs show the intensity of respiration in the albedo, flavedo and pulp of mandarin and lemon fruits during growth and maturation.

1481. TURRELL, F. M., AND SLACK, D. L.

Specific gravity of citrus fruits.

Proc. Amer. Soc. hort. Sci., 1948, 52: 245-50, bibl. 11.

The specific gravities of fruit of citrus species grown in similar districts in southern California in decreasing order were: Washington Navel orange, Eureka lemon, and Marsh grapefruit, but the differences though consistent were not significant. The specific gravity was consistently but not significantly lower in the drier regions. There was a negative and significant correlation between size of fruit and specific gravity. [From authors' summary.]

1482. NAUDÉ, C. J.

The fertilizing of citrus.

Fmg S. Afr., 1949, 24: 15, 20.

Notes on planting and on the application of nitrogenous and phosphatic manures. The application of potash is unnecessary, for South African soils generally contain enough and, if kraal manure is applied every three years, there will be no lack of potash.—Sub-tropical Horticultural Research Station, Nelspruit.

1483. LAVRIČUK, I. I.

Prostrate lemon growing. [Russian.]

Sad i ogorod (Orchard and Garden), 1949, No. 2, pp. 44-50, illus.

The lemon is the least frost resistant of the citrus species grown in the coastal regions of the Black Sea. One method of obviating this difficulty is by growing the bushes prostrate, on or near the ground. In the method described the main stem is vertical to a height of 10-15 cm., the primary branches being disposed radially at right angles to the stem and a little above the ground, so as to form a spider's web shaped crown. The prostrate form ripens its fruit earlier than the usual form. The microclimate of such plants is discussed. The soil beneath them retains more moisture than that under ordinary bushes, the plants suffer less from strong winds, and they are more perfectly covered by the protective snow. When covered with muslin or plant material and a layer of snow the prostrate plants withstand temperatures of -14° or -15° C. Data given show yields from such plants to be higher than those from bush trees. The method allows the extension of lemon culture to more northerly regions of the Soviet subtropics and lemons may be grown in areas subject to strong winds.

1484. NATIVIDADE, J. V.

A bergamota. (The bergamot orange.)

[Summary in English and French.]

Bol. Junta nac. Frut. Lisboa, 1948, 8: 151-7.

The qualities of the fruits of species of *Citrus* and related genera, some still almost unknown in Portugal, are briefly reviewed, and the attention of growers is drawn to the possibility of growing the bergamot orange in the south and centre of the country for the production of essential oils.

1485. HAAS, A. R. C.

Potassium, calcium and magnesium content in citrus flowers collected from trees on various rootstocks.

Proc. Amer. Soc. hort. Sci., 1948, 52: 7-10, bibl. 3.

Collections were made of Eureka lemon flowers on

10 December 1946 and 20 October 1947 and of Valencia orange flowers on 17 April 1945, and the percentage of K, Ca, and Mg in their dry matter determined. The results indicated that the percentages were associated with the nature of the rootstocks used, a note of which had been taken in each case. The findings are discussed.—Riverside, Calif.

1486. VAN DER MEULEN, A.

On the possibility of vegetative propagation of djeruk "seger besar" by seedlings.

Meded. alg. Proefst. Landb. Buitenzorg 57, 1948, pp. 7, bibl. 2.

This variety is very resistant to all of the many citrus stem diseases and is therefore recommended as a rootstock variety in Java. As its cuttings have not yet been rooted the possibility is discussed of raising vegetative seedlings from nucellar embryos. The characters of these vegetative seedlings are described. The variation in the leaf types of vegetative and of generative seedlings is illustrated.

1487. MCALPIN, D. M.

Winter drop of grapefruit. Reduction by spraying.

J. Dep. Agric. Vict., 1949, 47: 53-6, bibl. 2.

One of the problems of the grapefruit growers in Victoria is the prevention of the heavy winter drop of fruit. During the winter of 1948, many trees lost all their fruit from this early drop. In trials carried out in various parts of Victoria it was found that a 2,4-D spray reduced the winter drop of grapefruit by 90%. The recommended spray contains 22 p.p.m. of the sodium salt, summer white oil being used as a spreader and sticker. The spray is best applied late in May, when summer growth has ceased. The spray should be so directed as to wet thoroughly the calyx of each fruit. [A note of this will also be found in *Citrus News*, 1948, 24: 189.]

1488. SILBERSCHMIDT, K.

Acumulação e mobilização do amido em folhas de laranjeira atacada pela "tristeza". (The accumulation and mobilization of starch in the leaves of "tristeza"-diseased orange trees.) [English summary 1½ pp.]

Rev. Agric. S. Paulo, 1948, 23: 295-322, bibl. 19, illus.

Sachs' half leaf iodine test was applied to citrus leaves of healthy and tristeza-affected trees. After a darkening period many of the healthy leaves were starch-free while most of the diseased leaves, though they had lost some of their starch, showed that they still retained considerable quantities. These results are compared with those of other workers in relation to the arrest of starch in leaves of plants affected with certain virus diseases, particularly leaf roll of potatoes.

1489. SCHNEIDER, H.

Sieve-tube necrosis, an early symptom of collapsing and declining lemon trees.

Abstr. in *Phytopathology*, 1948, 38: 918.

Fourteen-year-old lemon trees budded on grapefruit stock showed necrosis of part or all of the sieve tubes just above, but not below, the bud union in May 1947. By May 1948 many of the trees showed yellowing of leaves and partial defoliation; the fruit ripened prematurely and was small.

1490. CALAVAN, E. C., AND WHITE, F. A.

Differences in susceptibility of lemon strains to dry bark.

Abstr. in *Phytopathology*, 1948, 38: 913.

Six of the 15 strains examined were entirely free from dry bark, whereas the other 9 strains broke down in percentages of 7 to 73. The 9 susceptible strains developed dry bark in all orchards where they were known to be planted.

1491. MALLAMAIRE, —, AND ROBLOT, —.

Sur l'emploi de hexachlorocyclohexane (H.C.H.) et du sulphure de polychlorocyclane (S.P.C.) dans la lutte contre les termites au Sudan français. (The use of H.C.H. and S.P.C. for the control of termites in the French Sudan.)

C.R. Acad. Agric. Fr., 1948, 34: 941-2.

The use of HCH or of SPC for checking citrus gummosis, caused by *Phytophthora citrophthora* and *P. parasitica*, is advocated because they control termites which prevent the healing of lesions and accelerate the destruction of the trees. The preparations, applied as powders, are strewn around the trees and hoed in, and irrigation is carried out in such a way that the water does not come in contact with the base of the trees.

1492. ANON.

"Tip-burn" of citrus leaves.

Citrus News, 1948, 24: 163.

In the past tip-burn in New South Wales citrus areas was sometimes held to be a symptom of salting, but recent work from Mildura goes to show that the condition may be caused by an excess of boron.

1493. ANON.

Lime tree disease in the Gold Coast.

Threat to industry.

Crown Colon., 1949, 19: 55.

A note on die-back, the virus disease which has taken heavy toll of trees. A campaign is on foot to destroy diseased trees by burning and to replace them by limes grafted on lemon rootstocks which are said to be immune to the disease.

1494. GODFREY, G. H., AND RYALL, A. L.

The control of transit and storage decays in Texas lemons.

Bull. Tex. agric. exp. Stat. 701, 1948, pp. 24, bibl. 24.

The chief fungi responsible for wastage in lemons during transit and storage are *Diplodia natalensis*, green mould (*Penicillium digitatum*) and blue mould (*P. italicum*). The losses can be controlled (0 to 5% decay) by chemical dips, effective treatments being 5% sodium metaborate (Metbor) and 1.2% sodium ortho-phenylphenate (Dowicide A), and the effectiveness is increased by wrapping the fruits in diphenyl-impregnated tissue wraps. Control can also be increased by following the chemical dip treatment with exposure to 0.03 p.p.m. nitrogen trichloride gas in the ethylene gas colouring room, or even in the car after loading (Decco process).

1495. BLISS, D. E.

Soil disinfection in [Californian] citrus orchards against *Armillaria* root rot.

Abstr. in *Phytopathology*, 1948, 38: 913.

Armillaria mellea was found to a depth of 9 feet in sour-orange roots. Treatment with carbon-disulphide was made in soils containing artificially inoculated citrus root segments planted at 1-foot intervals in vertical series 8 or 10 feet deep. The charges of CS₂ applied at 18-in. staggered intervals killed the fungus in roots at depths of 1 to 10 feet according to the volume of CS₂ applied and the type of soil. Surface charges failed to penetrate a clay substratum.

1496. KIELY, T. B.

Black spot of citrus in New South Wales coastal orchards.

Agric. Gaz. N.S.W., 60: 17-20, illus.

Black spot (*Phoma citricarpa*) is one of the most serious citrus diseases in coastal orchards of New South Wales, where losses estimated at £70,000 in one year have been suffered. The spots develop on leaves and fruit, particularly on the Valencia orange; three types, hard spot, freckle spot, and spreading or virulent spot, are produced during the year on unsprayed trees. Leaves of a number of bush shrubs harbour latent infections, but these host plants are not regarded as being nearly such important sources of infection as dead citrus leaves. The life cycle of the disease is shown diagrammatically. Spraying according to a definite programme (not here set out) has given highly satisfactory results.

1497. KLOTZ, L. J., AND STEWART, W. S.

Observations on the effect of 2,4-D on citrus fruit-stem dieback.

Abstr. in *Phytopathology*, 1948, 38: 915.

The cause of a citrus dieback, accompanied by fruit drop, in California is attributed to adverse climatic and soil conditions. 2,4-dichlorophenoxyacetic acid, applied in May and June, delayed fruit drop, and reduced fruit-stem dieback 80-90%.

1498. TRIFOLIATA IMPROVEMENT COMMITTEE, DEP. AGRIC. N.S.W.

Selection of citrus budwood to control scaly butt in Trifoliata rootstock.

Agric. Gaz. N.S.W., 1949, 60: 31-4, bibl. 1, illus.

The variable results obtained from grafting Washington Navel orange on Trifoliata (*Poncirus trifoliata*) rootstock [H.A., 16: 1010] are considered, from experimental evidence, to be due to virus infection. On affected trees a stunting effect is often associated with a condition known as scaly butt [H.A., 16: 1339]. It is now recommended that all budwood for use on Trifoliata stock should be taken from good trees of the required varieties growing on non-scaling and non-dwarfing Trifoliolate rootstock.

1499. FRIEND, A. H.

The fruit fly problem and some details of recent control tests.

Agric. Gaz. N.S.W., 1949, 60: 35-9, bibl. 11.

From experiments on young citrus trees in pots it was concluded that "3422" (Parathion) plus sugar was the most promising substance yet used in a sugar bait against the Queensland fruit fly (*Strumeta tryoni*) adults.

1500. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

White wax scale (*Ceroplastes destructor*).

Agric. Gaz. N.S.W., 1949, 60: 41-2.

Soda sprays are recommended for the control of the white wax scale on citrus and other shrubs, the concentration depending on the size of the scales, viz. young scales 10 lb., older scales 12-15 lb., of washing soda in 40 gal. water. They are usually applied about February or March in New South Wales.

1501. ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, N.S.W.

Red scale (*Aonidiella aurantii*).

Agric. Gaz. N.S.W., 1949, 60: 42-3.

The red scale is the most injurious pest of oranges, mandarins, and lemons in parts of New South Wales and it also infests many other trees and shrubs, including mulberry, rose, and grape. It is most effectively controlled by fumigation with hydrocyanic gas, but control may also be obtained by spraying with a miscible or emulsified petroleum oil.

1502. RIPLEY, L. B., PETTY, B. K., AND HEPBURN, G. A.

Soil insecticides for the citrus snout-beetle.

Sci. Bull. S. Afr. Dep. Agric. 259, 1947, pp. 18, being *Ent. Ser.* 19.

Of 70 chemicals tested for duration of toxicity in soil, 16 persisted long enough to be regarded as useful soil insecticides, and 6, which lasted particularly well, were selected for investigation against *Sciobius granosus*. Inter-still residue is the most satisfactory product available commercially; its extraordinary duration is apparently due to the poly-methyl-naphthalenes present in it in small quantities. With the most promising chemicals a concentration of 0.36% by weight is sufficient to give the required duration of toxicity, i.e. 8 weeks when applied to a depth of 2 in. The dose is 1 to 4 lb. per tree. In an appendix it is stated that, in laboratory experiments, pentachlorophenol was strikingly superior to poly-methyl-naphthalenes and inter-still residue, killing 100% of the larvae after 11 weeks.—Cedara College of Agriculture, Natal, S. Africa.

1503. BAINES, R. C., CLARKE, O. F., AND BITTERS, W. P.

Susceptibility of some citrus species and other plants to the citrus-root nematode, *Tylenchulus semipenetrans*.

Abstr. in *Phytopathology*, 1948, 38: 912.

A list is given of species and hybrids of *Citrus* and related genera the roots of which were found to be infested with the nematode. Species with roots free from the nematode were *Balsamocitrus dawei*, *Clausena lansium*, *Murraya paniculata*, *Severinia buxifolia*, and 3 of 20 hybrids of *Poncirus trifoliata*. The resistant plants may be valuable in developing nematode-resistant rootstocks for citrus.

1504. EBELING, W.

Effect of citrus red mites on a California red scale population.

J. econ. Ent., 1948, 41: 109.

An infestation of citrus red mite, *Paratetranychus citri*, will prevent the normal development of colonies of the scale, *Aonidiella aurantii*, on the same plant. The red

scale "crawlers" are not able to settle and form whitecaps, and thus die out without completing the first instar of their development.—Univ. of California, Los Angeles.

1505. OSBURN, M. R., AND MATHIS, W.
Effect of DDT on Florida red scale population.

J. econ. Ent., 1948, 41: 454-6, bibl. 6.

No control of the Florida red scale (*Chrysomphalus aonidum*) on citrus was obtained by sprays containing DDT; in fact, these were found to increase the scale population considerably. This is attributed to the destruction of scale parasites and predators by the DDT.—Bureau of Entomology and Plant Quarantine.

Tung.

(See also 1691.)

1506. MASSA, L.
Esperimenti di coltura dell'Aleurites nell'Africa Orientale Italiana. (Aleurites trials in Italian East Africa.)

Agric. colon., 1942, 36: 183-7, illus.

A very brief discussion of trials of *Aleurites fordii*, *A. montana*, *A. cordata* and *A. triloba*. *A. fordii* and *A. cordata* appeared most promising.

1507. WEBSTER, C. C.

Tung nursery work.

Nyasaland agric. Quart. J., 1948, 7: 83-92, bibl. 3.

Refers to *Aleurites montana* in Nyasaland. The date of sowing seed in the nursery and details of subsequent nursery practice depend upon the type of plant which it is desired to put out in the field. This is mainly a matter of whether budding is done in the field or in the nursery. The methods which may be adopted are summarized.

1508. KILBY, W. W.

Recent research in breeding and selection of tung.

Proc. Amer. Soc. hort. Sci., 1948, 52: 81-7, bibl. 19.

An account of tung classification in China and of breeding work in Nyasaland and in U.S.A., with a note only of its occurrence in Indo-China, the Dutch East Indies and S. Africa, the species concerned being *Aleurites fordii* and *A. montana*.

1509. LAGASSE, F. S., POTTER, G. F., AND BLACKMON, G. H.

Relative variability of fruits of seedling and budded tung trees.

Proc. Amer. Soc. hort. Sci., 1948, 52: 107-11, bibl. 1.

The variability in fruits of seedling tung trees was very much greater than that in those of trees grown from buds of the same parents.

1510. LARROQUE, P.

La sélection des abrasins. (Tung selection.)
Oléagineux, 1949, 4: 160-4, 221-6, bibl. 7, illus.

An account is given of the results obtained with *Aleurites montana* in Tonkin by applying the author's methods of selection. Some brief particulars are

given on soil, climatic and other requirements of *A. montana*.

1511. NEFF, M. S., DROSDOFF, M., AND SHARPE, R.
Effect of different seedling rootstocks on growth, production, and nutrient absorption of tung clones.
Proc. Amer. Soc. hort. Sci., 1948, 52: 97-102, bibl. 7.

In trials at Cairo, Georgia, a statistically significant influence of rootstock has been demonstrated for: (a) the number of primary branches forcing out along the trunk, (b) cross-sectional area increases of trunks, (c) overgrowths at bud union, (d) percentage of nitrogen, phosphorus, potassium, calcium, and magnesium in leaves, (e) yields of fruit, (f) dry weights of leaves, and (g) air-dry weights of individual fruits. Highly significant correlations existed between high fruit production and low (favourable) overgrowth score, and between high fruit production and high N/K ratio in the scion leaves. [From authors' summary.]

1512. EMMEL, M. W.

The toxic principle of the tung tree.

Bull. Fla agric. Exp. Stat. 431, 1947, pp. 35, bibl. 14, illus. [received 1949].

Saponin, which is toxic, was isolated from the foliage of *Aleurites fordii*, *A. montana*, *A. moluccana* (*A. triloba*) and *A. trisperma*. It was more abundant in *A. fordii* than in the other 3 species. Saponin was isolated also from kernels of *A. fordii*. The kernel of the fruit of *A. fordii* contains a toxic substance in addition to saponin.

1513. LAGASSE, F. S., AND DROSDOFF, M.

The nutrition of tung trees.

Proc. Amer. Soc. hort. Sci., 1948, 52: 11-18, bibl. 16.

The nutritional problems of tung so far as they concern N, P, K, Mg, Zn, Mn, Fe, and Cn are discussed. It is felt that more attention paid to the nutrient element balance and to the use of sprayed or injected minor elements may well repay the trouble involved.—Gainesville, Fla.

1514. PAINTER, J. H., DROSDOFF, M., AND BROWN, R. T.

Responses of bearing tung trees on Red Bay fine sandy loam to potassium and nitrogen.

Proc. Amer. Soc. hort. Sci., 1948, 52: 19-24, bibl. 4.

Low K conditions were aggravated by liberal N application. K deficiency was most effectively corrected by a crotalaria mulch. Gains in cross-section of trunk and yield of air-dry fruit were increased independently as the result of adding N or K.—Gainesville, Fla.

1515. SITTON, B. G., AND OTHERS.

Increasing tung profits with potassium.

Batt. Crops, 1949, 33: 21-4, illus.

On soils in the western part of the tung belt in the United States that are relatively rich in potassium, high yields have been attained by applying 0.16 lb. of nitrogen per tree per year of attained age; but after 3 to 5 years the oil content of the fruit had declined seriously. The application of potassium at the rate of 0.75 lb. K₂O for each lb. of nitrogen used has

maintained a high oil content of approximately 21%. On soils in the eastern tung-growing areas, which are low in available potassium, the application of both potassium and nitrogen was necessary, not only to maintain oil content but also to attain maximum yields. [From authors' summary.]—Bureau of Plant Industry, U.S. Dep. Agric.

1516. SITTON, B. G.

Response of bearing tung trees to nitrogen, phosphorus, and potassium fertilizers.
Proc. Amer. Soc. hort. Sci., 1948, 52: 25-39, bibl. 10.

Tests were started in 1942 on a 5-year-old tung orchard near Bush, La., on sandy loam soil applying different amounts of N, P, and K. While yields during the years 1943 to 1946 were increased most quickly and to the greatest extent by the use of N, ultimately highest yields followed the use of all three fertilizers. It was found that when high N was used in combination with low K, K in the leaves declined over a 4-year period till it nearly reached deficiency level. When $\frac{1}{2}$ lb. of K_2O was used in combination with each lb. of N applied, a slight decline of K in the leaves was observed. Only when K was applied at a high level, in combination with N at a low level, was the original K content of the leaves fully maintained.

Other crops.

1517. MORGAN, C. N.

The choko [*Sechium edule*].
Qd agric. J., 1948, 67: 261-5, illus.

An almost exact reproduction of the useful article in the same journal 1944, 58: 27-32; *H.A.*, 14: 1369, q.v.

1518. THÉE, J.

Pelouses Nord-Africaines: *Stenotaphrum* ou *Pennisetum*. (Lawns in North Africa: *Stenotaphrum* or *Pennisetum*.)
Rev. hort. Paris, 1948, 120: 324-5, bibl. 5, illus.

Mesembryanthemum and *Achillea* are suggested as plants that will make a very good green surface in dry areas of North Africa where irrigation is difficult. Lucerne has the advantage that it can be used as fodder, but needs abundant irrigation and must not be allowed to flower. For "true" lawns, however, *Stenotaphrum americanum* or *Pennisetum clandestinum* (known as kikuyu) are the only possibilities. Of the two, kikuyu develops more quickly and is more resistant to drought. It remains a good green the whole year round, but needs regular cutting.

1519. LOEST, F. C., AND NEL, E. A.

The papaw and its cultivation [in S. Africa].
Fmg S. Afr., 1948, 23: 789-94, 814, bibl. 2, illus.

In S. Africa the papaw thrives best under the sub-tropical conditions found in Natal and in parts of the E. Transvaal lowveld. Unfortunately its successful cultivation is constantly threatened by various problems and malpractices. Experiments are described from which it is concluded: (1) That the best seedbeds were those made from (a) pure sand, to which nutrient solutions or liquid manure were added, (b) ordinary seedbed soil with about 1 in. of clean sand on top.

Seedbeds should be raised 6 in. and seed sown $\frac{1}{2}$ in. deep. (2) That cheese-cloth shade over seedbeds was better than grass. Hessian is also recommended. (3) That the percentage of seedlings obtained from sowings made for summer planting was considerably less (60%) than those for autumn planting, a result mainly due to *Pythium* stem rot. Plants should be defoliated in the nursery before transplanting and should be shaded in the field with grass caps (about 3 ft. high). For rich soils, 10 ft. \times 10 ft. spacing is recommended, 10 ft. \times 6 ft. for poorer soils. Approximately 4 oz. of seed per morgen ($2\frac{1}{2}$ acre) is required for the wider spacing and 7 oz. for the closer. The productive life of the papaw in the Transvaal lowveld is 3-5 years. After the third year the crop diminishes and the trees grow so tall as to increase harvesting costs enormously. The practice of cutting down over-tall trees to encourage side growth is not recommended for the commercial grower. Time of planting has a bearing on height of tree; thus an orchard planted in March (autumn), from seed sown in January, can be profitably maintained for at least a year longer than an orchard planted in December-January (summer) from a September sowing. This is because an autumn planting has only 1 $\frac{1}{2}$ -2 months' active growth before winter as compared with 4-5 months for the summer planting, which results in the tree making excessive vegetative growth before bearing its first crop and so becoming over-tall at an earlier age.

1520. TUBANGUI, M. A., AND BASACA, M.

Notes on the anthelmintic properties of the latex of papaya (*Carica papaya* Linn.) and of "isis" (*Ficus ulmifolia* Lam.).
Philipp. J. Sci., 1947, 77: 19-24, bibl. 7 [received 1949].

The latex of *Carica papaya* and that of *Ficus ulmifolia* were found to possess anthelmintic properties against ascarids, trichurids, and pinworms. The effective anthelmintic principles are proteolytic enzymes (ficin and papain) which are capable of digesting live worms. [From authors' summary and discussion.]

1521. DAVIDSOHN, A.

Pomegranate juice as a new natural indicator.
Analyst, 1948, 73: 679.

A few drops of the juice of the pomegranate serves as an excellent indicator for acidimetric titrations, giving a red colour at about pH 3.3 and below and a blue colour at about pH 6.4 and above.

1522. EBBOTT, I. E.

Passion fruit growing in north-eastern Victoria.
J. Dep. Agric. Vict., 1948, 46: 508-10, illus.

Early attempts in north-eastern Victoria have shown that passion fruit of good quality can be grown successfully in certain areas, particularly in Lurg and Warby Ranges districts and a brief account is given of how success has been achieved. Most vineyards are planted with Black Passion seedlings, but experimental plantings of grafted vines are being tried.

1523. GAYFORD, G. W.

Passion fruit spraying and pruning.
J. Dep. Agric. Vict., 1948, 46: 561.

In a season favourable to fungous diseases brown spot (*Alternaria passiflorae*) may cause trouble in passion fruit plantations. It can be controlled with bordeaux mixture 6: 4: 80. Pruning will also assist in the control, the best time being early spring before new growth starts. Old vines which contain tangled masses of dead wood should be thinned out to allow of efficient spraying and to improve aeration.

1524. CHU-YING CHOU, TUNG-KWANG FANG, AND AN-KUO LIN.

A preliminary study of sweetpotato varieties and yields in Eastern Fukien.) [Chinese, English summary $\frac{1}{2}$ p.] *Fukien agric. J.*, 1948, 9: 137-47, bibl. 13, illus.

The record of a preliminary survey of 13 sweet potato varieties with regard to varietal characters, qualities, uses, insects, diseases and winter hardiness in the districts of Foochow, Futsing, and Pingtan during 1947. The annual sweet potato crop in Fukien amounts to 38 million piculs (1 picul=110.23 lb.).

1525. HASSELL, O. L.

Sweet potato growing in Central Queensland.
Qd agric. J., 1949, 68: 1-15, illus.

Mainly concerned with a description of suitable varieties, of which 10 are illustrated. Short notes are also given on soils, propagation, planting, cultivating, ratooning, harvesting, pests, etc.

Noted.

1526.

a CALAVAN, E. C., AND WALLACE, J. M.
Exosporina branch blight of grapefruit in southern California.

Abstr. in *Phytopathology*, 1948, 38: 913. The disease is attributed to *Exosporina fawcetti*.

b CONOVER, R. A.

Phytophthora seedling blight, a new disease of Florida avocados.

Yearb. Calif. Avocado Soc. for 1948, pp. 88-90, bibl. 2, illus.

c EBELING, W., AND PENCE, R. J.

Control of the greenhouse thrips, long-tailed mealybugs and June beetles on avocados.

Yearb. Calif. Avocado Soc. for 1948, pp. 93-5.

- d DICKEY, R. D.
Cold injury to dormant buds of two tung varieties and its effect on yields.
Proc. Amer. Soc. hort. Sci., 1948, 52: 115-16, bibl. 3.
- e FRIEND, W. H.
Citrus variety situation.
Amer. Fruit Gr., 1949, 69: 1: 19, 59.
- f HALMA, F. F.
Replacing declined and sun-blotched avocado trees.
Yearb. Calif. Avocado Soc. for 1948, pp. 90-2, illus.
- g KLOTZ, L. J., AND EVANS, H. D.
Control of citrus brown rot, gummosis, and rind oil spotting by long exposures to low moist heat.
Abstr. in *Phytopathology*, 1948, 38: 916.
- h LAI-YUNG LI, AND CHU-YING CHOU.
The ascorbic acid content of the flowers of some citrus trees. [Chinese, English summary $\frac{1}{2}$ p.] *Fukien agric. J.*, 1948, 9: 99-104, bibl. 7.
- i LAI-YUNG LI, AND CHU-YING CHOU.
The Chinese date [or jujube] (*Zizyphus jujuba*) as a rich source of vitamin C. [Chinese, English summary 1 p.] *Fukien agric. J.*, 1947, 9: 6-13, bibl. 8.
- j RYAN, H. J.
Olive scale on avocados.
Yearb. Calif. Avocado Soc. for 1948, pp. 96-8.
- k SCHROEDER, C. A.
Progress report on avocado breeding [in California].
Yearb. Calif. Avocado Soc. for 1948, pp. 71-3, bibl. 7, illus.
- l STEWART, W. S., SMOYER, K. M., AND PUFFER, R. E.
Progress report on effects of plant growth regulator sprays on avocados.
Yearb. Calif. Avocado Soc. for 1948, pp. 113-16, bibl. 2, illus.
- m WOLFENBARGER, D. O.
Heilipus squamosus Lec., a new enemy of the avocado.
Yearb. Calif. Avocado Soc. for 1948, pp. 98-102, bibl. 3, illus.
- n ZENTMYER, G. A., AND KLOTZ, L. J.
Soil fumigants for control of *Phytophthora* root rots.
Abstr. in *Phytopathology*, 1949, 39: 26.
Of avocado and citrus.

TROPICAL CROPS.

General.

(See also 1155-1159, 1403a.)

1527. TERRA, G. J. A.

Gewassen voor droge streken. (Crops for dry regions.) [English summary $2\frac{1}{2}$ pp.] *Landbouw*, 1948, 20: 415-64, bibl. 47, illus.

In the high regions of Java, and those with a long dry season, the mixed gardens of the peasants, that

contribute so much to the local diet in fertile areas, are small and unproductive. In an attempt to find garden crops suitable for these dry regions, the author made a physiological study of the capacity of plants for water absorption under various soil conditions, and investigated the causes and results of wilting. A schedule is given of the types of plant suitable for (a) dry regions with only small amounts of water in the soil, and (b) regions where water reserves are available only as salty water, at a depth, or in

water-holding but impervious soils. Horticultural practices are suggested that would increase the amount of available water, decrease transpiration, or decrease the physiological need of the plant for water.

1528. CLAUS, F.

L'horticulture et le Congo. (Horticulture and the Congo.)

Cour. hort., 1949, 11: 189-90, illus.

A historical account of the interchange of plants between Belgium and the Belgian Congo, and of the establishment of botanic gardens at Kisantu (Bas-Congo), at Eala (on the equator, Belgian Congo), and at Laeken, near Brussels.

1529. PRILLWITZ, P. M.

De producties der ondernehmenscultures in 1948. (Production of plantation crops in Java and Sumatra in 1948.)

Bergcultures, 1949, 18: 35-7.

Statistics are given of the amount of land in Java and Sumatra that is at present producing rubber, tea, coffee, quinine, palm oil, fibre, cocoa, sugar and tobacco. This is compared with the pre-war areas under production in the whole of Indonesia. The 1948 production figure in tons of each crop in the federal area is compared with the pre-war figure for Indonesia as a whole. Although energetic reconstruction work has been in progress since the federal area came under Dutch control in 1947, much remains to be done to bring the land back to full production. Scarcely more than half of the area of tappable rubber trees, for instance, was actually being tapped.

1530. SATIADIREJA, R. S.

Propagation by cuttings of some tropical plants.

Chron. Nat., 1949, 105: 15-19.

The root-forming capacity of cuttings of a number of decorative and economic tropical plants, that are normally difficult to propagate, was investigated at the Treub Laboratory, Buitenzorg. Application of growth substances (β -indoleacetic acid or α -naphthaleneacetic acid) was successful in inducing rooting in many cases, notably *Chodanthus splendens*, *Hibiscus syriacus*, *Ixora incarnata* and *Mussaenda* spp. Other factors, such as age of material, and season of propagation, are specified, but in most cases were not compared experimentally. Humidity was found to be an important factor in the rooting of *Mussaenda* species, and cuttings of young seedlings of *Citrus medica* rooted readily, although mature plants appeared to have lost this capacity. *Licania rigida*, which may become economically important as an oil-producing plant, does not root readily from cuttings, but marcottage gave very promising results, especially when β -indoleacetic acid was applied to the cut.

1531. TOXOPEUS, H. J.

Over de plantmateriaal-positie van enige overjarige handelsgewassen, die snel in productie komen. (The plant material position of certain perennial commercial plants which quickly come into production.)

Meded. alg. Proefst. Landb. Buitenzorg 72, 1948, pp. 18.

Discusses measures for increasing the acreage of certain plants which come into full production within

about two years from planting. The species mentioned are *Derris elliptica*, *Cymbopogon nardus* (sereh), *Amorphophallus oncophyllus*, *Boehmeria nivea* (ramie), *Chrysanthemum cinerariaefolium* (pyrethrum), *Pachyrhizus angulatus* (bangkowan), *Mundulea sericea* and *Clausena anisata*.

1532. MAMET, R.

A food-plant catalogue of the insects of Mauritius.

Bull. (sci. Ser.) Mauritius Dep. Agric. 30, 1948, pp. 74.

This catalogue lists 418 species of plants representing 91 families. The plants are arranged in alphabetical order of their scientific names, and a list of the local names is also given for reference.

1533. VAN WEE, P. B.

Some notes on the African giant snail, *Achatina fulica* Fér. III. Observations on its biology, and IV. On its biological balance and means of destruction.

Chron. Nat., 1948, 104: 335-6, bibl. 7, and 105: 25-7, bibl. 12, illus.

These further studies of the giant snail (see *H.A.*, 19: 571) deal with its habits of feeding and reproduction, and the possibility of control. The most vulnerable point in the life history of this snail appears to be during emergence from the egg, which takes 6-10 hours, and the population is probably limited by the attack of natural enemies during this period. At other times natural enemies are few, although there is some evidence of a parasitic fly. Population studies, however, suggest that a biological balance will gradually re-establish itself in the Dutch East Indies as it has in Mauritius. [It is doubtful whether a biological balance has been established in Mauritius, where this snail is still a serious pest.—Ed.] The only reliable control at present is to collect the snails and eggs by hand and burn them. Clean weeding makes conditions less suitable for propagation. On a small scale trees may be protected by banding with freshly tarred coconut fibres, and gardens protected by filling the surrounding ditches with ashes soaked in copper sulphate.

Cacao.

1534. GOODALL, D. W.

A quantitative study of the early development of the seedling of cacao (*Theobroma cacao*).

Ann. Bot. Lond., 1949, 13: 1-21, bibl. 14.

A study was made of the course of growth of cacao seedlings, in an attempt to determine to what extent the plant depends on its cotyledons for nutrition, at what stage it becomes independent of reserves stored in the seed, how much of the seed reserves are consumed before this occurs, and how food material is distributed among the various organs as development proceeds. Measurements of dry weight, water content and leaf area were taken at 1- or 2-day intervals during the first 7 weeks after planting. The relative growth rate and net assimilation rate found for cacao are much lower than for other species studied, and the period before the seedling regains the seed dry weight is exceptionally long.—West African Cacao Research Institute, Tafo, Gold Coast.

1535. ALEWIJN, F.
Cacao in West Java [in Dutch].
Bergcultures, 1949, 18: 66-7.
 An account, based on the author's experience at the experimental estate of Radjamandala, of the propagation of cacao seedlings, their care during the nursery stage, planting methods and the establishment of windbreaks and shade trees.

1536. BERKELEY, G. H., CARTER, W., AND VAN SLOOTEREN, E.
Report of the commission of enquiry into the swollen shoot disease of cacao in the Gold Coast.
Colonial 236, H.M. Stationery Office, Lond., 1948, pp. 10, 3d.
 The chief findings of the commission were as follows. Swollen shoot is a very dangerous and contagious virus disease which threatens the very existence of the cocoa industry of the Gold Coast. The cutting out of diseased trees is the only measure known for the control of swollen shoot disease and this should be resumed as promptly as possible and on a greatly increased scale. Only by an accurate, thorough, and continuous application of this method can a reasonable assurance of success be expected. Rehabilitation of heavily infected areas should not be attempted until removal of all sources of infection is complete. Subsidiary measures may assist in control and rehabilitation, but they are entirely secondary to the cutting out programme. The research programme at the West Africa Cacao Research Institute is essential to the maintenance of the cocoa industry in the Gold Coast and its facilities and land should be extended and its personnel increased. The educational programme should be materially extended, for only in this way can mutual trust and confidence be established between farmers, scientists, and all concerned.

1537. EVANS, G.
Cocoa disease in the Gold Coast.
Nature, 1949, 163: 271-2, bibl. 1.
 A review of the report of the commission of enquiry into swollen shoot disease of cacao in the Gold Coast, with a discussion of some of its recommendations. [See No. 1536 above.]

1538. BAKER, R. E. D., AND DALE, W. T.
Virus diseases of cacao in Trinidad—II.
Trop. Agriculture Trin., 1947, 24: 127-30, bibl. 3, illus. [received 1949].
 The results of further experiments and observations on the virus disease of cacao, first reported from Trinidad by Posnette (*ibid.* 1944, *H.A.* 14: 1899), are presented. The two strains described by Posnette as "red-mottle" and "vein-clearing", are re-named strains A and B, respectively, and their symptoms are described. From a study of the condition of virus-free trees and those infected for varying periods, in the same field of clonal cacao, it is clear that the disease is producing dieback. There are also indications that an adverse effect on yield is developing as a result of infection. Both strains were readily transmitted by budding. Preliminary trials have shown that more than one species of mealy bug can transmit strain A. Neither strain has been transmitted mechanically and there is no evidence of seed transmission. [From authors' summary.]

1539. POSNETTE, A. F., AND STRICKLAND, A. H.
Parasitism of the mealybug vectors of swollen-shoot of cacao.
Nature, 1949, 163: 105-6, bibl. 2.
 Preliminary experiments suggest that parasites used to suppress mealybug on coffee might also be effective against *Pseudococcus njalensis*, the most important vector of swollen shoot of cacao.—West African Cacao Research Institute, Tafo, Gold Coast.

1540. GIESBERGER, G., VAN DUYVENDIJK, J. A., AND ROBBERSSEN, F. C.
Enkele gegevens over rattenbestrijding in de cacao-cultuur. (Rat control in cacao plantations.)
Bergcultures, 1949, 18: 68-9.
 During 1947 a serious plague of rats in the cacao plantations of Siloewok Sawangen and Kedondong made drastic and large-scale measures for their control necessary. Poison bait, consisting of a phosphorus compound and coarsely ground raw maize, was placed at the mouth of the holes and in the trees. Teams of specially trained men and dogs were also used to dig out the rats. Preparation of the bait and other details of the control measures are described, by means of which damage due to rats was reduced to normal proportions within a few months.—Indonesia.

Coffee.

1541. FERWERDA, F. P.
Coffee breeding in Java.
Econ. Bot., 1948, 2: 238-72, bibl. 45, illus.
 A historical survey of coffee breeding in Java, based mainly on the work carried out at the Government Coffee Experiment Station, Bangelan. During the last 10 years much attention has been given to problems of defective seed development, and empty bean formation has been shown to be a cytological effect. Just before the war, suitable methods were developed for the vegetative propagation of rootstocks, but investigations into stock and scion effects are still in the experimental stage.

1542. PEREIRA, H. C.
Yellowing of coffee [in Kenya].
Mon. Bull. Coffee Bd Kenya, 1948, 13: 133.
 A short note on the bright yellow tints of [*arabica*] coffee leaves observed in 3 Kenya coffee areas [about September-October 1948], suggesting the need for N applications. The same yellowing in experimental plots receiving N confirmed the view that the colour change was not a result of N shortage. Where wilting of leaves is observed, as well as yellowing, the trouble may be traced to water shortage. The importance of grass or other mulch under coffee to conserve soil moisture is stressed.

1543. VAN DER GOOT, P.
Biologische bestrijding van witte luis (*Phenacoccus iceroides* Gr.) op koffie in de Toradja-landen (Zuid Celebes). (Biological control of a mealybug (*Phenacoccus iceroides* Green) on coffee in the Toradja District (South Celebes).) [English summary 1½ pp.]
Meded. alg. Proefst. Landb. Buitenzorg 64, 1948, pp. 12, bibl. 15.

A description is given of a severe infestation of coffee trees by the mealy bug, *Phenacoccus iceryoides*. Other food plants of this pest are patjikala (*Pittosporum* sp.), *Citrus*, *Psidium*, and *Vitex cofassus*. A number of predatory and parasitic insects were tested, the coccinellid *Cryptolaemus montrouzieri* proving most satisfactory. Specimens were shipped to Celebes from Buitenzorg in 1928 and liberated in coffee plantations. Four months later the number of mealy bugs had been greatly reduced.

1544. NOTLEY, F. B.

Antestia and DDT.

Mon. Bull. Coffee Bd Kenya, 1949, 14: 175, bibl. 1.

A preliminary note on the use of DDT against antestia on coffee was published by the author in 1947 [see *H.A.*, 18: 657]. The method has now been in use at the Coffee Research Station, Lyamungu, Tanganyika, for 2 years and is reported to have "proved entirely satisfactory". So far there have been "no untoward effects on other insects", a danger which "appears to have been grossly exaggerated". A new method of applying DDT, as a fog spray, has been tried recently with success. For this, 1 gal. of DDT emulsion (13 oz. DDT, 13 oz. soap, 1 gal. power kerosene, and 1 gal. water) is diluted with 4 gal. water and the resulting mixture sprayed at the rate of 8 gal. per acre. Reference is made to mixing DDT and bordeaux. In a laboratory experiment a mixture of DDT and bordeaux appeared to be more rapid in its effect on antestia than DDT alone, but this difference was not statistically significant. The DDT is certainly not adversely affected by its mixture with bordeaux.

1545. MELVILLE, A. R.

Some experiments with antestia.

Mon. Bull. Coffee Bd Kenya, 1949, 14: 174.

A progress report giving a brief summary of results from 1948 experiments with various insecticides at the Coffee Research Station, Ruiru, Kenya. In the first experiment in which DDT emulsion (Notley's formula), pyrethrum powder, and Agrocide 3 were used against antestia, the conclusions reached were: (a) that all three treatments significantly reduced antestia populations over periods of 48 hours and 7 days; (b) that after 48 hours the effect of the DDT (85.8% reduction) was greater than that of pyrethrum (82.4%), which was in turn greater than that of Agrocide 3 (38.7%); (c) that after 7 days the effect of DDT (93.2% reduction) was significantly greater than that of either Agrocide 3 or pyrethrum. In the second experiment using pyrethrum powder, pyrethrum powder plus a synergist (piperonyl butoxide), Agrocide 3, Agrocide wettable powder, and DDT (50%) wettable powder, the conclusions reached were: (i) that immediate effects were significantly best for pyrethrum powder, Agrocide wettable powder, and pyrethrum powder plus piperonyl butoxide; (ii) that at 7 days, Agrocide wettable powder and DDT (50%) wettable powder were better than pyrethrum; (iii) that at 14 days, all treatments used were better than pyrethrum and that Agrocide wettable powder and DDT (50%) wettable powder were significantly better than the other three. The author urges caution in using insecticides with a prolonged residual effect (such as

DDT) which may destroy valuable parasites and predators.

1546. NOTLEY, F. B.

The *Leucoptera* leaf miners of coffee on Kilimanjaro. 1. *Leucoptera coffeella* Guér. *Bull. ent. Res.*, 1948, 39: 399-416, bibl. 7.

Two leaf miners of coffee, *Leucoptera coffeella* and *L. caffinea*, are present in the Kilimanjaro and Usambara districts of Tanganyika. The life-histories of *L. coffeella* and its parasites and a study made during 1937-40 of the populations of the host and its parasites in the Kilimanjaro area in both unshaded and shaded coffee are described. Some observations are made on the "dominant stage" of the host. [Author's summary.]—Coffee Research Station, Agricultural Dep., Tanganyika Territory.

1547. SEIXAS, C. A.

Prova de bebida de cafés tratados com inseticidas para combate à broca. (Taste trials of coffee treated with insecticides for control of berry borer.)

O Biológico, 1948, 14: 163-4, bibl. 1.

A report of trials carried out to discover whether the insecticides 666, DDT and Rhodiatox, tested by the Biological Institute, São Paulo, Brazil, for the control of coffee berry borer [see *H.A.*, 18: 2969], in any way tainted the drink made from treated berries. No taint could be detected in flavour or smell.

1548. DE TOLEDO, A. A.

Comportamento da vespa de Uganda (*Propsopis nasuta*) em cafezal sombreado. (Behaviour of the Uganda wasp in shaded coffee plantations.)

O Biológico, 1948, 14: 189-91.

The opinion is held by some that the incidence of coffee berry borer is greater in shaded plantations than in those in full sun. Experiments were planned at the Experimental Estate of the Biological Institute at Campinas to discover whether this might be due to shady conditions being unsuitable for the parasite of this borer, the Uganda wasp. Results in shaded plantations showed that parasitism was at least as great as that in full sun and that re-establishment of the parasite from new stock was more pronounced and regular.

1549. DUVAL, G., SAUER, H. F. G., AND FALANGHE, O.

Tratamento tardio dos cafezais com hexacloreto de benzeno. (Late applications of benzene hexachloride to coffee plantations [in Brazil].)

O Biológico, 1948, 14: 199-211.

When the coffee fruit is at the green, milky stage (February-March) it offers a natural resistance to the coffee berry borer. The insect then makes only superficial borings and is constantly on the move. Trials conducted at the Institute of Biology, Campinas, showed that this was the best time to apply benzene hexachloride for control of the borer.

1550. SEIXAS, C. A.

Erros e falhas no combate químico à broca do café. (Errors to be avoided in the control of coffee berry borer by chemical means.)

O Biológico, 1948, 14: 225-41.

The technique of chemical control for coffee berry borer is very new, and not yet well established. This communication from the Biological Institute, São Paulo, Brazil, discusses the factors on which success depends. Growers are warned that careful timing of the applications of benzene hexachloride, based on observation of the stage of fruit development and activity of the borer, is all-important, for the insect is vulnerable for a very short time. The advantages and disadvantages of various methods of application, and the form and strength of insecticide, are discussed.

1551. BRANZANTI, E. C.

La preparazione dell caffè al Kivu. (The curing of coffee in Kivu.)
Agric. colon., 1943, 37: 169-83, illus.
[received 1948].

The various operations devoted to coffee from harvesting to packing of the final product as carried out in Kivu in the Belgian Congo are described in some detail.

Fibres.

(See also 1690.)

1552. TOXOPEUS, H. J.

On the origin of the kapok tree, *Ceiba pentandra*.

Meded. alg. Proefst. Landb. Buitenzorg 56, 1948, pp. 19, bibl. 15.

The variability of *Ceiba pentandra*, the kapok tree, in the tropics is described. In America and Africa the species is very polymorphic, in Asia strikingly uniform. In Asia its characters are recessive and being adapted to domestication it was probably imported there by man. The American and African material contains many dominant as well as recessive genes. It is considered that the species is endemic in both Africa and America and in both cases a great diversity of forms has developed.

1553. TOXOPEUS, H. J.

Over de bloembiologie, de spontane hybridisatie en de veredeling van de Java kapok (*Ceiba pentandra* var. *indica*). (The flower biology, spontaneous hybridization and breeding of Java kapok.) [English summary ½ p.]

Landbouw, 1948, 20: 365-90, bibl. 4, illus.

Investigations by the Botanical Institute of the General Agricultural Experiment Station, Buitenzorg, into the pollination and fertilization of kapok brought to light much information that is of fundamental value in its breeding. Trees are generally self-pollinated, owing to the habits of the pollinating insects and the methods of planting, but spontaneous hybridization can occur to the extent of 16% under favourable conditions. Wind pollination, resulting mainly in selfing, occurs during the night. By day the bee, *Apis indica*, is the chief pollinating agent, and this insect tends to work one group of flowers intensively, so that cross pollination only occurs where the flowers of neighbouring trees are very close together, or during the early period of blossoming when few flowers are out. Less fertilization occurs in flowers pollinated by day than at night, because the pollen tube may have insufficient time to reach the ovule. This is due to the characteristic

growth cycle of the flower, which opens soon after sundown and falls 20-22 hours later. As a result of inbreeding the kapok population of Java is very homozygous. It is suggested that material from other countries should be introduced to produce hybrid vigour. The layout of a seedplot for breeding purposes, designed to prevent chance hybridization, is discussed on the basis of the preceding information on pollination.

1554. LOCK, G. W.

Report on the Mauritius fibre industry.
Rev. agric. Maurice, 1948, 27: 248-65, 296-314, bibl. 12.

A highly informative report based on a visit to Mauritius in October-November 1947 to advise on the industry in Mauritius hemp (*Furcraea*), known locally as "aloe", the annual production of which is 700-1,000 tons. A short history and description of the industry is followed by an account of its problems, observations on future development, surveys of each fibre area, a description of *Furcraea*, an account of production methods and factors affecting production, some suggestions for improving cultivation, notes on the extraction and utilization of the fibre, and on possibilities offered by research.

1555. WATKINS, J. M., AND ALLWOOD, E.

Retting of kenaf, *Hibiscus cannabinus* L.
J. Amer. Soc. Agron., 1948, 40: 997-1004, bibl. 5.

A report of experiments designed to study the retting of kenaf as affected by (a) pH and temperature in tank retting and (b) sprinkling and methods of stacking in stack retting. It was found that kenaf rets best at a temperature of 34° C., and that any method of softening the tissue aids in the fermentation process. A pH range of from 6.0 to 8.0 gave best results. Bundles of stems stacked parallel retted faster than those stacked crisscross, or loosely at random, for more moisture is conserved by close stacking. Although sprinkling the stacks shortened the process of retting, it involved much time and labour, so that dew retting is considered more economic. Comparing the tank and stack methods, it is concluded that the fibre resulting from tank retting is cleaner and glossier, and that less care is needed in sampling to prevent decomposition.—Centro Nacional de Agronomia, El Salvador.

1556. TOXOPEUS, H. J.

Experiences with the breeding of rosella, *Hibiscus sabdariffa*.

Meded. alg. Proefst. Landb. Buitenzorg 75, 1948, pp. 9, bibl. 1.

Genetical studies of hybrids, derived originally from the Victor variety, the large fleshy calyxes of which make a fragrant jelly, and a non-pigmented "white" rosella, both being branched forms useless for fibre. In the *F*₁ generation 1,000 plants were selected showing a long unbranched length of stem. The crossing of two closely related fibre types offers no definite possibility for selection, but crosses between the fibre type and two widely differing varieties, that are in themselves absolutely useless for fibre production, appear to be very successful.

Fruits.

1557. PUZZI, D.

Alguns aspectos da cultura da bananeira nanica no litoral paulista. (The cultivation of the dwarf banana in the coastal regions of São Paulo [Brazil].)

Rev. Agric. S. Paulo, 1948, 23: 353-6.

The meteorological conditions and a certain soil type, "barro", a compact clay with a superficial layer containing adequate humus, are stated to be particularly suitable for the cultivation of the dwarf banana (*Musa cavendishii*). The dwarf banana is rather resistant to diseases in this region, and there have been no serious epidemics. A few unimportant diseases are mentioned.

1558. CIFERRI, R.

Infectious chlorosis of bananas in Colombia.

Nature, 1949, 163: 175, bibl. 3.

A disease, of a virus nature, probably identical or closely allied to the "infectious chlorosis", or "heart rot", of bananas, has recently been found in Cauca Valley, on the Pacific side of Colombia.

1559. WEDDELL, J. A.

Control the banana weevil borer [*Cosmopolites sordidus* in Queensland].

Qd agric. J., 1948, 67: 146-9.

Notes on the habits of this borer and its depredations are followed by hints on keeping new plantations clean and on controlling the pest in bearing plantations. Poisoning is recommended, the procedure being to dust Paris green and flour, 1: 6, on freshly cut surfaces when desuckering or removing old, spent, stems. If the base of a cut stem is partly cut horizontally and the stump bent over, dusted within, and bent back again, it forms a very effective poison bait. Attempts to achieve biological control by the introduction of the beetle *Plaesius javanus* and the fly *Chrysopila ferruginosa* were unsuccessful. Another introduction, the beetle *Dactylosternum hydrophiloides* from Malaya, shows some promise. Experiments are being made with DDT and other insecticides.

1560. CARDEÑOSA BARRIGA, R.

Nuevo aspecto de las investigaciones sobre la "Rayadilla" del platano. (A new light on Rayadilla disease of plantains.)

Notas agron. Palmira, 1948, 1: 15-29, bibl. 23, illus.

There has been much controversy over the possible cause of Rayadilla disease of plantains (*Musa paradisiaca* L.), which is causing serious stunting and chlorosis of plantations in Colombia. The author gives evidence why it is unlikely to be either a virus disease or a bacterial wilt, and describes experiments, carried out at the Estación Agrícola Experimental de Palmira, that indicate nematode infection as the cause. Healthy plants, planted in infected soil, soon showed typical symptoms of the disease, but when replanted into clean soil (their roots having been carefully washed) they recovered completely. The plant nematodes, *Heterodera marioni* and *Tylenchus similis*, were found to be present on roots of affected plants, and several other species occurred occasionally. The author described further experiments in which he intends to inoculate plants with various nematode material, in

order to determine which species, or complex of species, is responsible for the disease.

1561. RUEHLE, G. D.

The common guava—a neglected fruit with a promising future.

Econ. Bot., 1948, 2: 306-25, illus.

A popular account of guava growing in Florida, and of the work done in recent years by the Florida Agricultural Experiment Station on the soil and cultural requirements of the guava, methods of propagation and selection of varieties. The trees are very susceptible to deficiencies of certain minor elements, and annual nutritional sprays of copper and zinc have been found very beneficial. Applications of magnesium and manganese should supplement liberal dressings of the major elements. A new form of air-layering is described, that has proved an excellent method of vegetative propagation. [See No. 1562 below.]

1562. RUEHLE, G. D.

A rapid method of propagating the guava.

Yearb. Calif. Avocado Soc. for 1948, pp. 108-12, bibl. 4, illus.

An improved method of air-layering is described. Limbs of $\frac{1}{2}$ inch or more in diameter are girdled by removing a strip of bark about $1\frac{1}{2}$ times the width of limb. The girdled area is bound with a ball of moistened sphagnum several inches in diameter and 4-5 inches long, which is then wrapped with a sheet of a heavy grade of translucent rubber plastic film (Vitanlon) and tied securely at each end with rubber bands or string. A piece of paper tied loosely over the wrap prevents birds from damaging the plastic and also prevents the moistened moss from overheating. Usually roots begin to form in 3-5 weeks. When the roots grow through the ball of moss, the stem may be severed below the girdled area. The plastic is then removed from the rooted stem, which is severed, potted, and kept in shade until new leaves appear, the soil being manured and the leaves sprayed with a copper-zinc-manganese solution in the meantime. When the new growth is 6-8 inches long the plant can be hardened in full sunlight preparatory to transplanting in the field. In Florida trees can be propagated in 4-5 months by this method of layering, the cost of which is low because of the elimination of watering.

1563. VENKATARAYAN, S. V.

Sex reversal (heterogamy) in the jack-fruit tree (*Artocarpus integrifolia* Linn.).

Curr. Sci., 1949, 18: 14-15, bibl. 6, illus.

The flowers of the jack-fruit are usually monoecious, on uni-sexual, axillary pedunculate receptacles. Abnormal inflorescences, observed on a tree at Bangalore in 1947-48, are described in which female flowers developed on the side and base of the male receptacle. Examples of sex reversal in other plants are cited and possible causes discussed.

1564. KRAUSS, B. H.

Anatomy of the vegetative organs of the pineapple, *Ananas comosus* (L.) Merr. I. Introduction, organography, the stem, and the lateral branch or axillary buds.

Bot. Gaz., 1948, 110: 159-217, illus., being *Tech. Pap. Pineapple Res. Inst. Hawaii* 186.

This is the first of a series of papers in which the author makes a complete study of the structure of the pineapple plant, and also reviews and evaluates the already existent literature on the subject. It was prepared primarily for use by the staff of the Pineapple Research Institute of Hawaii, as it was found that many problems of pineapple culture could only be solved by a thorough knowledge of the structure of the plant.

1565. BRIMBLECOMBE, A. R.

*Fruit-spotting bug [Amblypelta lutescens]
as a pest of the Macadamia or Queensland
nut.*

Qd agric. J., 1948, 67: 206-11, illus.

An additional insect pest of this nut. It spreads from other fruit crops and causes serious premature nutfall and nut malformation. Its life-history, habits, distribution, host plants, and the nature and effect of its damage are described. Constant inspection of plantations and early spraying of infested trees with 0.2% DDT is recommended, a second application being given a fortnight after the first.

1566. VILARDEBO, A.

*Un ennemi important des cultures fruitières
tropicales, Zonocerus variegatus L. (A pest
of tropical fruit crops, Zonocerus variegatus
L.)*

*Fruits d'outre mer, 1948, 3: 324-9, bibl. 4,
illus.*

A description of this cricket, its life history, habits, and depredations is followed by notes on control measures.

Rubber.

(See also 1398-1400, 1635-1638.)

1567. SEIBERT, R. J.

Onderzoeken over Hevea in Suid-Amerika. (A study of hevea (with its economic aspects) in the republic of Peru.) Abstr. from *Ann. Mo. Bot. Gdn*, 1947, 34, in *Chron. Nat.*, 1948, 104: 348-9.

An attempt is made to distinguish and classify the *Hevea* species. A study of their natural distribution indicates that it is this, rather than a genetic barrier, that prevents inter-breeding.

1568. VOLLEMA, J. S.

Voorlopige resultaten van de rubbertoetstuinen 1935, 1936 en 1937 (Proefuin Tjiomas). (Preliminary results of the rubber trials of 1935-7 at the Tjiomas trial grounds.)

Bergcultures, 1948, 17: 86-95.

Trial plots of several clonal rubber stocks, laid out by the W. Java Research Station, came into production in 1939-41. Detailed results are given of their performance. Three new clones, PR.226, PR.231, and PR.228, are recommended for planting on a small scale.

1569. VOLLEMA, J. S.

*Aanbevolen heveaplantmateriaal 1948-1949.
(Recommended planting material of hevea,
1948-9.)*

Bergcultures, 1948, 17: 101-7.

The association of the Central Experimental Stations here publishes a list of recommended clonal and seedling *Hevea* varieties, with a short account of the characteristics of each. It was not considered possible to recommend suitable stocks for each variety, but the general advice is given to use strong seedlings of an inherently good production capacity.

1570. DE VAL, W. A.

Rubberselectie. (Rubber selection.)

Bergcultures, 1949, 18: 59-61, illus.

A brief note and photographs showing the structure of a bamboo propagating shed in which rubber seed may be sown under controlled conditions. Nearly 100% even germination is claimed for this method of sowing.

1571. VAN SCHOONNEVELDT, J. C.

*Resultaten van de toetsing van Heveaclonen
in een vakkenproef op de onderneming
Tjimatis gedurende de eerste acht tappjaren.
(Results of the testing of hevea clones in a
plot experiment at the Tjimatis Estate,
covering the first 8 tapping years.)* [English
summary 1½ pp.]

*Arch. Bergcult. Ned.-Ind., 1948, 26:
181-200, bibl. 5.*

The growth rates, yield and susceptibility to bark disease of 8 hevea clones was compared in trials carried out by the West Java Research Station. Tjir 1 gave the highest yield per tree and per hectare for the whole period under review, and Ct 88 gave the lowest. The BD-clones proved most susceptible to stripe canker and lump canker. The response of some of the clones to the tapping systems used (S/3, d/2, 67%, and S/2, d/3, 67%) is discussed.

1572. MUZIK, T. J.

*What is the pollinating agent for *Hevea
brasiliensis*?*

Science, 1948, 108: 540.

From experiments and observations, made in Liberia, it appears that the answer to this question is still in doubt. Wind or insects are concerned in the pollination of most tree flowers, and it is difficult to conceive of any other agencies being effective. But the structure and arrangement of the inflorescence of *H. brasiliensis* indicate that wind is not the agent; yet if an insect does the pollinating, why has it never been identified?

1573. VAN SCHOONNEVELDT, J. C.

Stamtal en uitdunning van rubbertuinen.

(Thinning of rubber plantations.)

Bergcultures, 1948, 17: 109-13.

The extensive planting that took place during 1937-42, and the subsequent exploitation of the plantations during the Japanese occupation, has left the rubber planters of Java and South Sumatra with serious arrears of thinning. The West Java research station recommends selective thinning, in which the productive capacity of the tree is taken into account, as being more economic than systematic thinning to regular distances. In a monoculture plantation the productive capacity of the trees can be judged at first thinning by the relative thickness of the stems, but for later thinnings the latex production must be measured for each tree individually; for seedling trees latex yield is the only possible criterion. Thinning should be done gradually,

so that the highest possible yield per hectare may be maintained. The way in which the number of trees may be regulated according to age is shown graphically.

1574. VAN BAALEN, J.

Hevea-snoei. (Hevea pruning.)
Bergcultures, 1948, 17: 131-3.

With hevea seedlings the problem has always been to induce early branch formation, while with grafted trees early, vigorous branching has to be controlled, without delaying tapping. If a seedling does not branch naturally by the time it is 3½ m. high, it is advisable to strip the leaves off the leader, in order to stimulate the lateral buds into growth. This is considered better than tipping or ringing, as the tree will be less likely to fork. Clonal stocks vary tremendously in habit of growth, and must be pruned accordingly. The effects of various methods of pruning are discussed. In general, the less drastically a tree is pruned, the sooner will it be ready for tapping.

1575. VAN SCHOONNEVELDT, J. C.

Bemesting van rubber. (Manuring of rubber.)
Bergcultures, 1949, 18: 75-7.

In these notes from the West Java Research Station the manuring of young rubber trees, before they reach the tapping stage, and that of mature trees are dealt with separately. Young trees may be brought into production in 5 years by balanced manuring. On the poor red laterite soils of Batavia the need is for phosphate and potash rather than for nitrogen. The manuring of mature plantations is not always an economic proposition, and can only be recommended with confidence for trees on poor soil that have recently come into production.

1576. VAN SCHOONNEVELDT, J. C.

Optimumbemestingsproef bij jonge rubber in proefstuin Peweja. (Optimum manuring experiment with young budded hevea in the Peweja experimental garden.) [English summary 2 pp.]
Arch. Rubbercult. Ned.-Ind., 1948, 26: 201-19, bibl. 4.

A report of the manurial experiment carried out by the West Java Research Station on the old depleted laterite soil of Batavia, of the Depok-Mr. Cornelis type. The effect of varying applications of N, P, and K on growth and yield of young trees is discussed. In the given soil conditions tree growth was least vigorous on the unmanured plots and on those with limited supplies of potash. Very small amounts of nitrogen were sufficient for trees up to tappable age. The fertilizer treatment did not significantly affect the yield per tree, although it did affect the number of tappable trees per hectare, and thus the yield per unit area.

1577. VAN SCHOONNEVELDT, J. C.

Spiraaltap. (Spiral tapping.)
Circ. Proefstat. West Java 8, reprinted in
Bergcultures, 1948, 17: 75-8.

The shortage of labour and high wages in rubber plantations makes it difficult to keep the maximum area in production. This paper, issued by the W. Java research station, describes how the "Socfin" spiral tapping system, which was gaining favour before the

Japanese occupation, may be used to overcome these difficulties. Fewer tappers are needed, and the cost of tapping is about 35% lower than when normal short cuts are made, although the proportion of inferior rubber obtained is higher. The system is not suitable for young trees, as it would seriously restrict growth; with grafted trees it must be modified to give an intensity of 67%, and a 4 months' rest must be allowed every year.

1578. KEVORKIAN, A. G.

Bird's eye spot disease of hevea rubber in Nicaragua.
Phytopathology, 1948, 38: 1025-7, illus.

A bird's eye spot on hevea leaves (purple, becoming greyish white centrally) caused by *Helminthosporium heveae*, may, when severe, cause abscission of the top "flush" of young leaves. Budding successes may be decreased when defoliation occurs.—Harvard University.

1579. CHEVALIER, A.

Les lianes à caoutchouc de l'Afrique tropicale. (The rubber-bearing vines of tropical Africa.)

Rev. int. Bot. appl., 1948, 28: 390-421, bibl. 26, illus.

Short notes on the history of their exploitation, past research, ecology, and biology, followed by descriptions of the rubber-bearing species of *Landolphia*, *Clitandra*, and *Carpodinus*. It is stressed that our knowledge of these plants is incomplete. Further investigations are urged.

1580. PERRIER DE LA BATHIE, H.

Les plantes à caoutchouc de Madagascar, valeur et possibilité de leur culture. (Rubber plants of Madagascar: their value and the possibilities of growing them.)

Rev. int. Bot. appl., 1949, 29: 315-16: 17-20.

The most interesting rubber plants of Madagascar for a rubber growing industry are *Euphorbia intisy*, *E. pirahazo*, *Mascarenhasia* spp. and *Landolphia sphaerocarpa*. The first two are now rare trees, nearly extinct. They should be multiplied. *E. intisy* would be valuable for fertile lands in the west of the island and could be exploited like *Hevea*. *Mascarenhasia* could be multiplied throughout the island.

Sugar cane.

(See also 1692.)

1581. COOPER, ST. G. C.

Cane-farming in British Guiana.

Trop. Agriculture Trin., 1947, 24: 121-6, bibl. 10.

Mainly concerned with the economic aspects of sugar cane cultivation by small farmers, but also contains interesting references to local agricultural practices, including flood-fallowing.

1582. CLAYTON, J. L.

Sugar culture in Hawaii.

J. Aust. Inst. agric. Sci., 1948, 14: 193.

A short note on chemical control of weeds, irrigation, manuring, and harvesting. All sugar-cane plantations now use hormone herbicides, with or without C.A.D.E.

activated diesel oil emulsion), but methods of application and dosages are still subjects for trial and error. The aeroplane shows promise as a means of applying herbicides. Couch grass and oxalis in cane fields are difficult to control chemically but results against other weeds have been spectacular, so that most plantations do not now cultivate mechanically. Irrigation is assuming even more importance, since it is more economical to grow cane under irrigation in dry areas than on the wet, windward slopes. Mention is made of: a semi-permanent concrete flume with small gate valves for each furrow, paper flumes, and overhead sprays. The application of fertilizers in accordance with indications shown by the analyses of the growing plant has been well developed and excellent returns are claimed from the method. Harvesting the tangled 2-year-old crops is done mechanically and practically all transport to the mills is by large trucks, some taking 20 tons. A large amount of extraneous matter is brought to the mills with the cane and the cleaning of the cane necessitates an apparatus almost as complicated as the mill itself. At times one-third of all material coming to the mill consists of mud, soil, stones, and other rubbish, and at one particular mill one ton of this has to be removed every minute.

1583. CHENG-KUEI SHA, AND KWEI-TANG LIN.
A preliminary study of sixteen varieties of sugarcane. [Chinese, English summary 1½ pp.]

Fukien agric. J., 1948, 9: 105-16, bibl. 10.

The results are reported of an experiment (1947) to compare 16 sugar-cane varieties with POJ 2878 in Foochow.

1584. CLEMENTS, H. F.
Crop logging sugar-cane in Hawaii.

Bett. Crops, 1948, 32: 9: 11-48, bibl. 7.

The practice of crop logging, now used on 52,000 acres of sugar plantations in Hawaii, is based on research started 10 years ago at the University of Hawaii Agricultural Experiment Station. Samples of the crop, from specified tissue, are taken every 35 days, and chemical analyses made that indicate the moisture level and content of total sugars, total nitrogen, potassium, phosphorus, calcium and magnesium. The green weight of certain specified leaf sheaths is taken as an index of the general vigour of the plant. These data, when compared with a standard index of the needs of the crop at various stages of development, will indicate the need for fertilizers, irrigation, or changes in management. In this way management can be adapted with precision to crop needs, and the highest possible yield obtained under given conditions of soil or climate. A reliable system of ripening sugar-cane on irrigated plantations, formerly a difficult operation, has been developed by use of the crop log. It should be possible to apply the principles of crop logging to any long-lived crop.

1585. PANJE, R. R.
Wooden pans for sugarcane seedlings.

Curr. Sci., 1949, 18: 18.

A note in praise of so-called wooden pans [boxes] for raising sugar-cane seedlings. They measure 12 × 12 in. and hold approximately 600 cu. in.

1586. BRANDS, E. W., AND VAN OVERBEEK, J.
Auxin relations in hot-water-treated sugar-cane stems.

J. agric. Res., 1948, 77: 223-38, bibl. 11, illus.

Immersion of sugar-cane in hot water (52° C.) for 20 min. stimulates the development of lateral buds. This effect is nullified in one-bud cuttings by the application of auxin to the basal cut surfaces. Auxin analysis of the nodes of sugar-cane cuttings, immersed for 20 min. in hot water (50° C.) in comparison with nodes of control cuttings immersed for 20 min. in tap water at room temperature (26° C.) showed a decrease, sometimes of 50% or more, in the apparent free auxin level of the material treated with hot water.

1587. ASANA, R. D.

The absorption of nitrogen by the sugar-cane plant at different stages of growth.

Ann. Bot. Lond., 1949, 13: 237-40, bibl. 10.

Observations made over 4 seasons at the Central Sugar-cane Research Station, Bihar, Pusa, where sugar-cane is grown as an annual crop. It was found that after 28 weeks there was little uptake of nitrogen and little leaf growth. The theory that the sudden fall in the rate of uptake is related to the onset of the reproductive phase is discussed.

1588. HALAIS, P.

Résultats du contrôle biochimique des cultures de cannes poursuivi en 1948.
(Results of biochemical testing of sugar-cane plantations in 1948.)

Rev. agric. Maurice, 1948, 27: 276-80.

Biochemical testing of the crop by the foliar diagnosis method reveals the state of plant growth, particularly as it concerns the composition of the phospho-potassic reserve indispensable for the proper utilization of the large N dressings demanded by high-yielding canes such as M.134/32. In the author's opinion all cane growers in the Island should benefit from this advance in technique.

1589. LONG, B. E.

Edad optima para la cosecha de la Caña P.O.J. 2878 en el valle del Cauca. (Optimum age for cane harvest of P.O.J. 2878 sugar-cane in the Cauca Valley.) [English translation.]

Notas agron., Palmira, 1948, 1: 30-9.

The climatic conditions in the Cauca Valley are such that ripe cane may be harvested at any time between the age of 17 and 30 months. Records kept for the last 19 years at the Manuelita Office, Colombia, show that, with adequate rainfall, the optimum age for cutting is between 22 and 26 months. The limiting factor to high sugar yield is the amount of irrigation water available when rainfall does not exceed 48 inches a year.

1590. FOSTER, C. B.

The yield of sugar cane in Barbados in 1948.

Bull. Dep. Sci. Agric., Barbados, 12 (N.S.), 1948, pp. 14.

A series of tables, with some comments, based on returns from 275 plantations divided into low, intermediate, and high rainfall areas. The average yield

of cane per acre reaped for all areas was 19.85 tons, 90% of the total area being under the seedling variety B.37161.

1591. KHANNA, K. L., AND CHACRAVARTI, A. S.
Some observations on juices of diseased sugarcane.

Curr. Sci., 1949, 18: 19, bibl. 6.

Figures are given from Bihar, India, comparing juice from healthy cane with that from canes infected with red rot, *Colletotrichum falcatum*, and wilt, *Cephalosporium sacchari*. Red rot canes showed considerable losses in sucrose, as well as increases in invert sugar, colloids and ash. Wilt brought about similar changes in lesser degree.

Tea.

(See also 1675.)

1592. VAN STEIN CALLENFELS, W.
Theecultuur op Ceylon. (Tea growing in Ceylon.)

Bergcultures, 1948, 17: 67-73, bibl. 2.

In an address given to the Thee-Bond of Batavia the speaker gives an account of the changes that have occurred in methods of tea growing in Ceylon since 1937. The rationing of fertilizers to 200-300 lb. per acre of standard mixture, less than half that used before the war, has resulted in decreased production, and weakened plants, as pruning had to be done on young, thin shoots. The tortrix caterpillar is no longer a plague, due to the importation of a parasite from Java. The virus disease, phloem necrosis, has appeared in recent years, but far more serious was the outbreak of blister blight in 1946 that swept through the island. Until then restrictions of imports from N. India had kept Ceylon free of the disease. As this disease attacks young shoots, and thrives in a damp, shady atmosphere, the times and intensity of pruning and picking have been much modified, shade trees have been cut down, and copper fungicides are used regularly in nurseries and young plantations. Propagation methods are described, showing how resistant stocks may be built up.

1593. THOMPSON, A.

"Blister blight" of tea

Malay. agric. J., 1949, 32: 25-7, bibl. 3.

A brief account of this serious leaf disease, written mainly for the information of tea growers in Malaya which is still free of the disease. The chances of eradicating it, should it be introduced into Malaya, are regarded as almost nil. The most practical method of control would be the selection or breeding of resistant, or immune, varieties.

1594. TUNSTALL, A. C., AND SARMAH, K. C.

Black rot of tea in North East India
(*Corticium invisum* Petch and *Corticium theae* Bernard).

Mem. Tocklai exp. Stat. 19, pp. 26, bibl. 3, illus. [No date; received 1949.]*

The symptoms of black rot of tea are described, and illustrated in colour. Trials for control were carried out using burgundy mixture and lime-sulphur. To obtain control by burgundy mixture, about 50 gal per

year was required for 500 bushes, or about 250 gal. per acre. With lime-sulphur about 375 gal. would be required per acre, or 75 gal. of concentrate (30 Beaumé) at the strength used (1 in 5).

1595. HAINSWORTH, E.

Control of helopeltis by DDT spraying—1947.

Tea Prot. Series Indian Tea Ass. sci. Dep. 2, 1947, pp. 13, illus.

The biology of *Helopeltis theivora*, a hemipterous pest of tea bushes, and measures for its control are described. Experimental records and figures are not given. Those on which this pamphlet is based appear in the 4th quarterly report of the Tocklai Experimental Station for 1947. Control measures are based on hand catching and the application of DDT preparations, details of both methods being given. Tea which has been entirely shut up by helopeltis attack has been returned to full plucking after one spraying with a water suspension of DDT.

1596. BOSSCHIETER, J. C. A.

Het wederom in productie brengen van onze thee-onder nemingen en het *Helopeltis* vraagstuk. (Renovation of Dutch tea plantations [in Indonesia] and the helopeltis problem.)

Bergcultures, 1949, 18: 71-3.

If the renovation treatment of a neglected tea plantation is too sudden and severe it may result in a serious attack of helopeltis, to which weakened plants are especially susceptible. Hard pruning is dangerous, and it is suggested that one branch per bush should be left unpruned to continue photosynthesis. Risk of attack will be increased if an old stand of shade trees is cut down and replaced before the tea plants have regained strength. The ringing of old shade trees during the first year of renovation is advised, to prevent further growth.

1597. DAS, G. M.

The common looper caterpillar (*Biston suppressaria* Guen.).

Tea Prot. Series Indian Tea Ass. sci. Dep. 1, 1948, pp. 12, illus.

Of the eight different species of looper caterpillars on tea only the common looper caterpillar is considered important. Its life history and habits are described. Laboratory and field trials show that one application of DDT gives very effective control, i.e. DDT powder (50%) 1 lb. to 20 gal., or DDT emulsion (20-40%) 1 pint to 25 gal. Advice is given on preparation and application.

Other crops.

1598. HENRY, P.

Un *Elaeis* remarquable: le palmier à huile vivipare. (A remarkable *Elaeis*: a viviparous oil-palm.)

Rev. int. Bot. appl., 1948, 28: 422-7, illus.

A description of a mutant, now over 20 years old, found near Pobé, Dahomey, which produced vegetative buds in its leaf axils instead of inflorescences. Similar mutants were subsequently found on La Mé experiment station, Ivory Coast. The character is said to be

* Most recent data given concern 1940.

transmissible, thus in a progeny of some 10 palms, 4 were viviparous in varying degree. The possibility of breeding oil palms which could be multiplied sexually or asexually is mentioned.

1599. ORIAN, G.

Bud rot of the areca nut palm in Mauritius.
Rev. agric. Maurice, 1948, 27: 271-5, bibl. 3, illus.

A disease of the areca-nut or betel palm was detected in Mauritius in 1947. The causative organism has been shown to be *Xanthomonas vasculorum*. The symptoms and progress of the disease are described.

1600. MEREDITH, C. C.

Notes on the collection of the sap of the vegetable ivory palm (*Hypotheoea ventricosa*) and manufacture of palm wine spirit.
Rhod. agric. J., 1948, 45: 414-17, illus.

A very brief description of the tapping process for obtaining palm wine, and of the subsequent distillation, as carried out by natives in S. Rhodesia. The average palm [which is killed in the process] yields approximately 15 gal. of wine, from which about 1½ gal. of spirit, called Sikokian, can be distilled.

1601. WIT, F., AND TOXOPEUS, H. J.

De citronella-olie leverende grassen van Ceylon en Indonesië. (The citronella-oil yielding grasses of Ceylon and Indonesia.)
Meded. alg. Proefst. Landb. Buitenzorg 61, 1948, pp. 15, bibl. 16.

A review of the literature on the occurrence of cultivated forms of citronella grass, *Andropogon nardus* L. var. *genuinus* Hack. (*Cymbopogon nardus* Rendle) in Ceylon and in Indonesia, of the relationship of these forms with each other and with wild grasses, and of the characters of the cultivated and wild forms. Both in Ceylon and in Indonesia forms of the variety Lenabatu are preferred to the type Maha Pengiri.

1602. HODGE, W. H.

Wartime cinchona procurement in Latin America.

Econ. Bot., 1948, 2: 229-57, illus.

The development of a large-scale cinchona industry in the Latin American countries during the war led to some interesting investigations into its distribution, alkaloid content, and problems of harvesting, drying, and storage, which are described in this paper. An extensive survey of *Cinchona* species in Bolivia, Peru, Ecuador and Colombia resulted in the collection of a complete series of herbarium specimens, together with field observations on the most suitable growth conditions, and an analysis of alkaloid content of the bark, of each species found. In the course of sampling the bark, it was found that in most cases the highest concentration of alkaloids is in the trunk bark, although in a few species, including the important *C. micrantha*, the limbs contain more. Concentration was also found to vary with age and size of tree. This survey has made possible a breeding programme in which new strains are being introduced to obtain hybrids that may be not only high-yielding but hardier, easier to cultivate, and adapted to local conditions. Attention is being paid, too, to the content of alkaloids other than quinine, which can be utilized in making totaquinine.

1603. BALDRATI, A.

Indaco naturale e sintetico. (Natural and synthetic indigo.)
Agric. colon., 1940, 34: 383-7 [received 1948].

A discussion of the various types of *Indigofera* and of the possibility of their economic utilization for the production of indigo.

1604. TOXOPEUS, H. J.

Verdere gegevens over de biologie van de vruchtvorming bij *Strophantus gratus*. (Further data on fruit-setting in *Strophantus gratus*.)
Meded. alg. Proefst. Landb. Buitenzorg 74, 1948, pp. 22, bibl. 6, illus.

The author reviews the previous work of Wit [H.A., 11: 964] and adds an account of his own observations. The flowers and fruit of *Strophantus gratus* are described and illustrated, and the factors associated with pollination discussed. The amount of seed produced by a fruit varies according to strain. A 1-hectare plantation with distances of 4×4 m. could produce about 50 kg. of seeds yearly, containing 7.5 kg. of strophanthine, a quantity sufficient for 25,000,000 injections, being far more than the world's yearly need.

1605. CHILDERS, N. F., AND CIBES, H. R.

Vanilla culture in Puerto Rico.
Circ. Puerto Rico fed. Exp. Stat. 28, 1948, pp. 94, bibl. 385, illus.

After a short introduction on the history, market situation, and botany of this crop, detailed instructions are given for growing, harvesting, and curing vanilla, based on lengthy experiments, and the experience of Puerto Rico growers. Vanilla, unlike some tropical crops, requires careful attention from planting to harvest. In Puerto Rico a heavy soil mulch must be maintained, and sufficient, but not excessive, light must be admitted through the shade trees, support trees must be properly pruned, and artificial pollination carried out on a moderate scale. [A notably long bibliography is provided.]

1606. ZANEVELD, J. S.

De economische betekenis van zeewieren en de mogelijkheid tot hun exploitatie in de Maleise archipel. (The economic importance of seaweeds and their possible exploitation in the Malayan archipelago.)
[English summary ½ p.]
Chron. Nat., 1949, 105: 1-8, bibl. 31.

This paper deals with the species of seaweed that are commonly found on the coasts of the Malayan archipelago, and the uses to which they might be put. The nutritional and fertilizing value of the green and brown algae are discussed, and the possibility of developing a local agar-agar industry from the abundant red algae, in particular *Gracilaria*, *Gelidium*, and *Corallopsis*, which are a very rich source of agar. A simple and cheap peasant method of harvesting and extracting agar is described, but a warning is given that before a large-scale industry is started the following points need investigation: the distribution of the agar-producing species, the quantities available, the best means of harvesting the seaweeds, and the technique for extracting the colloids.

Noted.

1607.

a CHEVALIER, A.
Les Aurantiées de l'Afrique tropicale. (The *Aurantiaceae* of tropical Africa.) *Rev. int. Bot. appl.*, 1947, 27: 264-70, bibl. 6. Includes a short review of *Afraegle*, *Citropsis* and *Aeglopsis* species.

b APARICIO RANGHEL, G.
Las terrazas y su utilización en Colombia. (The use of terraces in Colombia.) *Agric. trop. Bogota*, 1948, 4: 11: 37-40, illus. To prevent soil erosion.

c BRENDL, O.
Die Bedeutung der afrikanischen Landwirtschaft und die Versorgung der übrigen Welt mit deren Erzeugnissen. (African agriculture and the products it supplies to the rest of the world.) *Bodenkultur*, 1948, 2: 75-89, bibl. 9.

d CANDUSSIO, R.
Il miglioramento del "neuk" (*Guizotia abyssinica* Cass.) prime indagini ed osservazioni e direttive del lavoro di selezione. (*Guizotia abyssinica*, investigations and considerations prior to selection.) *Agric. colon.*, 1941, 35: 347-54 [received 1949].

e CHEESMAN, E. E.
Classification of bananas. III. (e) *Musa basjoo* and (f) *M. nagenium*. *Kew Bull.*, 1948, 3: 323-8, illus.

f CONFORTI, E.
L'anguilluloso del banano nella Somalia Italiana. (Nematodes of banana in Italian Somaliland.) *Agric. colon.*, 1943, 37: 128-31, bibl. 7 [received 1948].

g FALANGHE, O.
Constatação de uma coleobroca como praga de abacaxi. (Appearance of a neck-borer beetle [*Paradiaphorus crenatus*] as a pest of pineapples.) *O Biológico*, 1948, 14: 165-7, bibl. 4, illus.

h FERRARA, A.
Analisi chimico-tecnologiche di semi oleosi dell'Africa Orientale Italiana. (Analysis of oil seeds of the following plants grown in Italian East Africa: ground nut, sesamum, linseed, sunflower, *Guizotia abyssinica*, castor bean, coconut (copra), oil palm.) *Agric. colon.*, 1943, 37: 85-98 [received 1948].

i HARDY, F., AND DERRAUGH, L. F.
The water and air relations of some Trinidad sugar-cane soils. Parts I and II. *Trop. Agriculture, Trin.*, 1947, 24: 76-87, 111-21, bibl. 5 [received 1949].

j LEROY, J.-F.
Sur un "complexe agamique" des manguiers et sur l'origine et la phylogénie des variétés cultivées. (Concerning an asexual complex in mangoes and the origin and phylogeny of cultivated varieties.) *Rev. int. Bot. Appl.*, 1947, 27: 304-9, bibl. 9.

k MASSA, L.
Prove di orientamento su alcune piante da fibra nell'Africa Orientale Italiana. (Notes on the cultivation in Italian East Africa of jute, ramie, roselle, *Urena lobata* and hemp.) *Agric. colon.*, 1943, 37: 70-8 [received 1948].

l MUKERJI, S., AND VENKATRAMAN, T. V.
Studies on *Epipyrops melanoleuca* Fletcher (Lepidoptera: Epipyropidae), an ectoparasite of the sugarcane leaf-hopper, *Pyrilla* spp. (Homoptera: Fulgoridae). *Proc. zool. Soc. Bengal*, 1948, 1: 91-102, bibl. 15, illus.

m OKIMOTO, M. C.
Anatomy and histology of the pineapple inflorescence and fruit. *Bot. Gaz.*, 1948, 110: 217-31, bibl. 25, illus.

n RAMOS NUÑEZ, G.
Breve historia moderna de la caña de azucar en Colombia. (A short historical account of the sugar-cane industry in Colombia in recent years.) [English summary 1 p.] *Notas agron.*, Palmira, 1949, 2: 1-8.

o SOETARDI, R. G.
Kort verslag van de resultaten van een enquête over het optreden en de bestrijding van mijten op hevea-kweekbedden. (Short report of the results of a questionnaire on the occurrence and control of mites in hevea nurseries.) *Bergcultures*, 1949, 18: 103.

p VENNING, F. D.
The ontogeny of the laticiferous canals in the anacardiaceae. *Amer. J. Bot.*, 1948, 35: 637-44, bibl. 14, illus.

STORAGE AND PLANT PRODUCTS.

Storage.

(See also 769, 1111, 1494, 1673.)

1608. ROSTOS, G. M.

Notes on some aspects of the design of fruit cool stores.

Food Pres. Quart., 1948, 8: 27-32, bibl. 6.

Some problems connected with the selection of the refrigerating and control system for a fruit cool store are discussed in the light of a recent survey, carried out by the Council for Scientific and Industrial Research, Homebush, N.S.W., of the physical conditions occurring in representative types of Australian cool stores.

1609. LOEWEL, E. L., AND MAUCH, A.

Luftkühlung im Obstlager. (The air-cooled fruit store.)

Mitt. Obstversuchsr. Jork, 1948, pp. 97-100.

A technical discussion with diagrams of a 3-storey fruit store ventilated by an electrically driven fan.

1610. PHILLIPS, W. R.

Storage and freezing of fruits and vegetables.

(Mim.) *Rep. Proc. W. Canad. Soc. Hort.*, 3rd annu. Meet., 1947, pp. 19-22, being *Contr. 699, Div. Hort., Exp. Fm Serv., Ottawa.*

Mainly concerned with the mechanics of marketing, e.g. methods of harvesting, transportation, packing, grading, storing, and processing. There is a need for plant breeders to develop new varieties suitable for freezing.

1611. TINDALE, G. B.

Overseas export of apples. Suggested improvements.

J. Dep. Agric. Vict., 1948, 46: 541-5, illus.

The article suggests pre-cooling and picking the apples at correct maturity, in order to compete in England with English gas-stored apples.

1612. HULME, A. C.

Studies in the nitrogen metabolism of the apple fruit. Changes in the nitrogen metabolism of the apple during the normal and ethylene-induced climacteric rise in rate of respiration.

Biochem. J., 1948, 43: 343-9, bibl. 7.

Evidence is produced that during the climacteric rise in rate of respiration in immature apples, whether occurring normally or whether induced by treatment of the fruit with ethylene, there is a highly significant rise in the net protein content of the fruit. A strong negative correlation is shown to exist between change in protein content and change in asparagine content, not only during the rise in protein which accompanies the respiration climacteric, but also during the steady fall in protein content which precedes the respiration climacteric in very young fruits. The other forms of soluble nitrogenous constituents show some negative correlation with change in protein content, but the correlation is less consistent. [Author's summary].—Ditton Laboratory, East Malling, Kent.

1613. VAN DOREN, A.

An air purification trial in a Wenatchee apple storage.

Proc. Amer. Soc. hort. Sci., 1948, 52: 205-12, bibl. 6.

SOUTHWICK, F. W., AND SMOCK, R. M. Further studies on air purification in apple storage.

Proc. Amer. Soc. hort. Sci., 1948, 52: 219-25, bibl. 4.

In tests with ten varieties of apple stored at about 32° F., at Pullman, Wash., air purification through activated carbon added a month or more to the storage life. Air purification provided about the same degree of protection from scald as did oiled paper wraps. In Cornell trials, Southwick and Smock, using Rhode Island Greenings, McIntosh, and Cortland, had similar results both as regards storage life and scald control, though they found that air purification cannot be relied on for scald control in mixed variety stores.

1614. ALLEN, F. W., AND CLAYPOOL, L. L.

Modified atmospheres in relation to the storage life of Bartlett pears.

Proc. Amer. Soc. hort. Sci., 1948, 52: 192-204, bibl. 6.This report from Davis, Calif., concerns the effects of gas storage on Bartlett pears during and after storage, including 5 different levels of oxygen and 6 different combinations of CO₂ and O₂. The data are critically discussed.

1615. BOYES, W. W., AND DE VILLIERS, D. J. R. Pre-storage treatment of peaches with acetylene gas.

Fmg S. Afr., 1949, 24: 9-10, 16.

Pre-storage of Peregrine peaches in 1% acetylene gas for 24 hours at 75° F. shortened the period of delay necessary to eliminate woolliness in subsequent storage. The treatment of Elbertas greatly improved their condition over that of controls at ordinary air temperature; they were less woolly and had better flavour, firmness and appearance.—West Province Fruit Research Station.

1616. ALDERMAN, D. C.

Some effects of harvesting methods and container performance on keeping quality of Louisiana peaches.

Proc. Amer. Soc. hort. Sci., 1948, 52: 149-56.

The author's observations allow him to mark 10 different types of container for peaches according to bruises in transport, rate of cooling, keeping ability, container strength, container appearance, ease of handling, and container cost, and to evaluate them accordingly.

1617. SHARVELLE, E. G., AND BURKHOLDER, C. L. The effect of low temperature exposure on the development of peach brown rot in common storage.

Abstr. in *Phytopathology*, 1949, 39: 22.

In samples obtained from commercially sprayed

orchards, cold storage treatment (24 hours at 40° F.) greatly reduced the subsequent development of brown rot in common storage.

1618. HEUBERGER, J. W., MUNGER, G. D., AND POULOS, P. L.

Post-harvest chemical dip treatment of peaches for control of brown-rot disease in the package.

Abstr. in *Phytopathology*, 1949, 39: 9.

Of a number of preparations tested the best results were obtained with Isothan Q-15 and liquid lime-sulphur. Isothan Q-15 did not affect the appearance, odour, or taste of the peaches. Liquid lime-sulphur did not affect the appearance or taste of the peaches, but did leave a slight sulphur odour which could be detected only at close range.

1619. RYALL, A. L., AND GODFREY, G. H.

Dip and gas treatments for the reduction of post-harvest decay in Texas lemons.

Phytopathology, 1948, 38: 1014-18, bibl. 2.

Nitrogen trichloride, in concentrations ranging from 0.003 to 0.04 p.p.m., when applied for 2 to 4 periods of about 4 hours each during de-greening, reduced stem-end decay (*Diplodia natalensis*) and green mould rot (*Penicillium digitatum*) materially in Eureka and Meyer lemons.—Texas Agricultural Experiment Station.

1620. GIESECKE, F.

Impfung als Grundlage eines neuartigen Gemüse-Konservierungsv erfahrens. (Inoculation as the basis of a new method of preserving vegetables.)

Ceres, Hamburg, 1948, 1: 10: 15-16, bibl. 8.

Attention is drawn to a process, developed during the recent war, which allows lactic acid bacteria to be concentrated in pure culture to such an extent that they can be supplied in tins in a virulent condition. A safe lactic acid fermentation of pickled vegetables can thus be assured. The product is marketed under the trade name of Agrohort.

1621. KRIJTHE, N.

Over de invloed van temperatuur en licht tijdens de bewaring van pootaardappelen op de oogst van Eerstelingen. (Influence of temperature and light on the early potato Eersteling under storage conditions.)

Versl. Landbouwk. Onderz. 54.5, 1948, pp. 40, illus.

Potatoes were stored during winter at temperatures ranging from 2° to 28° C., some in darkness, some in natural daylight, and others in constant artificial illumination. At 2° C. there was hardly any growth so that there was no difference between light and dark storage. At 5° C. and 9° C. the growth was more vigorous in darkness, and dark storage gave an earlier harvest than light storage. At 13° and 17° the yield was better from light storage than from dark. It follows that exposure to light must be regulated by the temperature at which the seed potatoes are stored. The sprout development may be improved by exposing the seed potatoes to a relatively high temperature, but only for 3 weeks before planting.

1622. CROOK, E. M., AND WATSON, D. J.

Studies on the storage of potatoes.* I. Changes in composition during storage in clamps.

J. agric. Sci., 1948, 38: 440-57, bibl. 21.

Changes in the percentage of dry matter, sugars, starch and nitrogen present in Arran Banner and Majestic potato tubers during storage in clamps until July or later were studied in two seasons. In the first season, the ascorbic acid content and the distribution of nitrogen between three fractions (insoluble, soluble coagulable, soluble non-coagulable) were also determined. In the second season, weighed samples of tubers were introduced into the clamps, so that changes in absolute amounts of the different constituents present in the tubers or sprouts could be measured. The effects of removing or retaining the soil cover on the clamps after early April were compared. The variations recorded are described and presented as tables or graphs.—Rothamsted Experimental Station.

1623. HINTZE, S.

Lagringsförsök med vitkål i källare med helautomatisk fläktning. (A storage trial with white cabbage in an automatically ventilated cellar.) [English summary ½ p.] Reprinted from *Årsskr. Lanbr. Trädgårdslinst.*, 1948, pp. 335-46, bibl. 2, as *Medd. Trädgårdslinst. Malmö* 49.

In the south of Sweden a storage trial was carried out with cabbage during the winter of 1947-48 in a cellar, which was automatically ventilated by fans. Temperatures did not exceed +3° C., except for the first week of February and after 20 March. Losses at the end of March and at the end of April amounted to 17% and 25% respectively, as compared with 21% and 32% in cabbages stored in ventilated clamps, where the temperature, as a rule, was somewhat higher. The preservation of sugar and vitamin C content was superior in the cellar.

1624. ANON.

New froth-flotation process efficiently cleans vined peas.

Research Achievement Sheet U.S. Dep. Agric. 116(C), 1949, pp. 2, bibl. 3.

Froth flotation, a technique first used by the mining industry for concentrating ores, has now been adapted for the commercial cleaning of vined green peas. It reduces the labour required to sort vined peas, improves the quality of the packaged product, and saves for market large tonnages of peas that would otherwise be discarded because of heavy contamination with foreign material. The process depends upon differences in "wettability" between peas and foreign matter when they are passed through tanks containing a special chemical solution. Tiny air bubbles, dispersed through the solution by a circulating pump, provide a froth that helps to float out the contaminating substances. The wetting properties of the water used in the process are controlled by adding sodium lauryl sulphate to the solution. This causes sound peas to become wet more easily than nightshade berries and other contaminants. Wettability differences are further increased by putting a small amount of light mineral oil into the solution.

* See also 1323-1325.

1625. BARE, C. O.
Laboratory tests with fumigants for insects infesting stored tobacco.
J. econ. Ent., 1948, 41: 13-15, bibl. 1.
 Acrylonitrile-carbon tetrachloride was shown to be a very promising fumigant for the control of the cigarette beetle (*Lasioderma serricorne*) and the tobacco moth (*Ephestia elutella*) in stored tobacco. Tests indicate that it is safe to use on tobacco, and gives better penetration and more effective kill of larvae than trichloroacetonitrile or hydrocyanic acid.

1626. PAGE, A. B. P., AND LUBATTI, O. F.
Some effects of fumigants on food.
Chem. Industr., 1948, pp. 723-7, bibl. 13.
 In their paper, read before the Food Group of the Society of Chemical Industry in February 1948, the authors discuss seeds, vegetables, fruits and other foods to which fumigation is applied in storage to control insects. Whatever the nature of the chemical actions of fumigants on foods and seeds, the effect can be greatly reduced (1) by the use of a good system of fumigation and the minimum quantity of fumigant, (2) by a low moisture content of the foods or seeds.

Plant products.
 (See also 1673.)

1627. KEFFORD, J. F.
Refrigeration in the fruit juice industry.*
 Reprinted from *Refrig. J.*, 1948, Vol. 2, 5 pp., bibl. 35, illus.
 An address to the Australian Institute of Refrigeration, N.S.W. Division, on 21.6.48. The following special applications seen during visits to Britain, Germany, and U.S.A. in 1947 are discussed: storage under the Boehi system, the A.P.V. modified Boehi process, concentration of fruit juices by freezing, the Krause-Linde continuous process, frozen orange juice concentrates, and the refrigeration cycle evaporator.

1628. BLIN, H.
L'industrie des figues sèches en Algérie.
 (The dried fig industry in Algeria.)
Rev. hort. Paris, 1948, 120: 368-71, illus.
 An account of the mechanical equipment for the drying, sterilizing and packing of figs that has recently been introduced to Algeria, to replace the traditional methods of the Kabyles.

1629. YAZAR, T. B.
 Kuru üzümler üzerinde bazi arastirmalar.
 (Raisin research.) [Summary in German, English and French.]
T.C. Yüksek Ziraat Enstitüsü, Ankara, No. 96, 1939, pp. 48 [received 1949].
 Attention is called to the important raisin industry of the Ege district of Turkey. The native methods are described. The potash solution into which the grapes are dipped before drying has a density of 3-8° Bé and contains 4-10 g. of olive oil per litre. The standard types are classified according to size and transparency of the raisins. Methods for the determination of their moisture content are described. The permissible moisture content for exported raisins is not more than 17-18%.

* This Bureau is just going to press with T.C.21 by V. L. S. Charley entitled "Recent advances in fruit juice production".

1630. ELLIS, H. M., AND WEAVER, J. W.
Drying crops with a flue tobacco barn.
Ext. Circ. N.C. St. Coll. Agric. 328, 1948, pp. 6.
 Certain seed crops can be dried safely in bins built under a shed along one side of a flue tobacco barn, heated air being drawn by fan from the barn and forced into the bins. Instructions and plans are given for constructing such a dryer.

1631. READ, J.
Studies in Australian plant chemistry.
Chem. Industr., 1948, pp. 747-8.
 The summary of a lecture dealing with essential oils and their Australian plant sources.

1632. HOWES, F. N.
Vegetable sources of drying oils.
Research, 1949, 2: 68-73, bibl. 12.
 Includes short accounts of the following plants and their oils: tung, oiticica (*Licania rigida*), *Stillingia*, conophor (*Tetracarpidium conophorum*), walnut, candle nut or lumbang (*Aleurites moluccana*), and castor. Brief reference is made to *Ricinodendron* spp. and *Garcia nutans*.

1633. DESAI, C. M., AND VYAS, M. T.
Chemical investigation of the seeds of *Jatropha curcas* Linn.
Curr. Sci., 1949, 18: 49, bibl. 6.
 A short note on the uses of these seeds, together with some constants from a sample of jatropha oil (yield 44%) obtained, by extraction with carbon tetrachloride, from seeds collected in Gujarat.

1634. ŠAMŠURIN, A. A.
Oil from catalpa seeds. [Russian.]
Priroda (Nature), 1948, No. 11, p. 52.
 A brief note on the findings of G. V. Lazurjevski and V. G. Globin (*Bull. Sagu* 23, 1945) that oil extracted from seeds of *Catalpa bignonioides* compared favourably with that from tung seeds (*Aleurites cordata*). Their chemical compositions are tabulated for comparison. It is thought that catalpa oil should be valuable in the paint industry.

1635. VAN GILS, G. E.
 De oproming van hevea latex met behulp van alginaten. (Creaming of hevea latex by means of alginates.)
Bergcultures, 1949, 18: 51-3.
 Until this year the use of alginates for the creaming of rubber latex has been exclusively in the hands of the U.S. Rubber Company, protected by a patent. In May 1949 the process will be freed. This article gives an outline of the technique involved. One great advantage of alginates over K-meal is that no grains of the creaming agent remain in the cream, so that for most purposes further clarification is unnecessary.—Indonesian Institute for Rubber Research.

1636. ALTHUISIUS, F.
 Natriumsilicofluoride als coagulant bij de rubberbereiding. (Sodium silicofluoride as a coagulant in the preparation of rubber.)
Bergcultures, 1949, 18: 99-101, bibl. 4.
 The costs of latex coagulation could be reduced by the use of a mixture of sodium silicofluoride and formic acid instead of formic acid alone. This mixture could safely be used for the preparation of crêpe rubber, but

it gives very variable results in sheet rubber preparation.
—A.V.R.O.S. Res. Stat., Medan.

1637. LUMSDALE, R. A.

Het opromen van latex. (Creaming of latex.)
Bergcultures, 1948, 17: 142-5, bibl. 1.

Glucomannan, a colloidal substance obtained from *Amorphophallus* corms, can be used for the preparation of concentrated latex, suitable for shipment. This method renders centrifuging unnecessary, so that capital expenditure on expensive equipment is avoided. At present this new process cannot be used on all types of latex, but there are hopes that this difficulty may be overcome. The author describes the creaming process and the equipment that is needed, and gives an estimate of the cost involved. Notes are given, too, on the culture of the amorphophallus root, and the extraction of mannan.

1638. HONIG, P.

Moderne Ionen-uitwisselaars, een nieuw hulpmiddel in de chemische technologie. (Modern ion exchangers: a new tool in chemical technology.) [English summary.]
Chron. Nat., 1949, 105: 65-74, illus.

A description of the composition and mechanism of modern ion exchangers. Their possible use in the manufacture of standardized and stable latex is discussed.

Noted.

1639.

a ABREU VELHO, H. L.

Notas sobre a qualidade do óleo de palma exportado pela Colónia. (Notes on the quality of palm oil exported by the Portuguese colony, Angola.)

Agron. angol., 1948, 1: 75-9.

1640. COMMONWEALTH BUREAU OF SOIL SCIENCE.

Bibliography of soil science, fertilizers and general agronomy, 1944-1947.
C.A.B. Central Sales Branch, Penglais, Aberystwyth, pp. 451, 35s.

The studious horticulturist cannot omit this from his reference library. It contains long ordered lists of references to articles dealing with soil and fertilizer problems of horticultural and plantation—among other—crops, a comprehensive alphabetical index of the Universal Decimal Classification system, on which the ordering of the references is based, and finally a very considerable list of journals of agricultural interest with their place of origin and abbreviations. That some of the abbreviations seem to us rather strange in no way detracts from the value of the work.

1641. CROCKER, G. W.

Growth of plants.

Reinhold Publishing Corporation, New York; Chapman & Hall Ltd., London, 1948, pp. vi + 459, illus., 60s.

As the sub-title indicates, this book reviews "Twenty Years' Research at Boyce Thompson Institute". In addition reference is made to investigations carried out elsewhere but "only such outside researches are discussed as are necessary to orient the work at the

b ALDE, M. R., AGCAOILI, F., AND J.-COCHICO, R.

Jatropha curcas Linn. (tuba) as a source of natural dye.
Philipp. J. Sci., 1947, 77: 55-60, bibl. 2 [received 1949].

c BECKER, R. B., AND OTHERS.
Citrus pulp silage.

Bull. Fla agric. Exp. Stat. 423, 1946, pp. 16, illus. [received 1949].

d BIALE, J. B.

Respiration of citrus fruits [lemons] in relation to metabolism of fungi. II.* Effects of emanations of *Penicillium digitatum*, Sacc. on lemons at different stages of ripeness.
Proc. Amer. Soc. hort. Sci., 1948, 52: 187-91, bibl. 3.
Storage life greatly reduced.

e RYGG, G. L.

Relative humidity for storing dates at different temperatures.

Proc. Amer. Soc. hort. Sci., 1948, 52: 173-5, bibl. 1.
Pomona, Calif.

f YOUNG, R. E., PRATT, H. K., AND BIALE, J. B.

Micromanometric estimation of ethylene in the emanations of ripening fruit.
Abstr. of paper presented to The Botanical Society of America in *Amer. J. Bot.*, 1948, 35: 814.

* For Part I see *Amer. J. Bot.*, 1941, 28: 263-70.

NOTES ON BOOKS AND REPORTS.

Institute generally in the whole field of plant science". Each chapter thus gives a fairly complete and concise account of the subject under discussion. In the introduction there is a brief biographical note on Colonel Boyce Thompson, the founder of the Institute, and on the aims and scope of the work carried out there. The first eleven chapters describe the investigations that have been directed towards twelve larger projects in their fundamental aspects and in their practical application, including work on aster yellows, peach yellows and their vectors, life span and dormancy of seeds, the effects of gases (particularly ethylene) on plants, plant hormones and dormancy in buds, and there is one long chapter on "Plants grown under controlled environmental conditions" with particular reference to illumination. Two chapters having an indirect bearing on "plant growth" are "Research on insecticides" by A. Hartzell, and "Fungicide investigations" by S. E. A. McCallan. Many of the investigations described have a direct horticultural bias, such as those on plant hormones in relation to the rooting of cuttings, prevention of preharvest fruit drop, the production of seedless fruits, and those on the effect of ethylene in its relation to fruit ripening. The book is illustrated by graphs, many photographs, and 7 coloured plates. Each chapter closes with a list of relevant papers.

H.W.

1642. CZECHOSLOVAK BOTANICAL SOCIETY.

Preslia [Acta Societatis botanicae Českoslovakiæ Praha], 1948, Vol. 22/23, pp. 246.

In this volume there are set out in English the names and addresses of the very numerous and often important societies and institutes devoted to botany and applied botany in Czechoslovakia. First 28 Botanical Societies are listed. Then come the institutes set up in the following cities:—Prague, Brno, Bratislava and Košice. At Prague they are subdivided into those belonging to (1) *The Charles University*, including a Botanical Institute, Botanical Garden, Institute for Plant Physiology with departments for microbiology and genetics. (2) *The Technical University* with other very similar sounding institutes. (3) *The National Museum*. (4) *The Masaryk National Hydrological Institute*. (5) *Federation of the State Agriculture Research Institutions*. They are similarly subdivided in the other centres. The Institute most particularly concerned with horticulture is the *Ustav vinařsko-ovocnický* [Institute for vine and fruit growing], Director Dr. I. K. Kamenický. It forms part of (5) above and its address is Na cvičišti 2, Prague XIX. These details are followed by the names and addresses of Czechoslovak botanists and by a full note on plant collections at the *Institute of Plant Physiology* of the Charles University at Prague. Finally there is a comprehensive list of botanical [and applied botanical] papers published in the years 1940-1946, exact references being given as well as English translations of titles in each case. Many of these are of horticultural interest.

1643. ELLIS, C., AND SWANEY, M. W.

Soilless growth of plants. 2nd edition. Reinhold Publishing Corporation, New York, 1947, pp. 277, bibl. 41, illus., \$4.75 or 28s. 6d.

This book has been completely rewritten since its first appearance in 1938 (*H.A.*, 8: 1334) in the light of the very considerable experience of the author and others in different parts of the world. The instructional part is prefaced by short and simple notes on plant physiology, followed by a discussion of the different kinds of soilless culture, namely water, sand, and gravel cultures. Separate chapters are devoted to each type of culture and considerable attention is paid to the theory and practice of making and maintaining suitable nutrient solutions. The authors deal with the disease and nutritional disturbances likely to affect plants grown in this way and the control of such conditions. A final chapter is devoted to analyses of the nutrient solution. It should prove an invaluable textbook for anyone wishing to grow plants thus as a hobby or commercially.

1644. GENDERS, R.

Cut flowers and bulbs for pleasure and profit.

Littlebury & Co., Worcester, 1948, pp. 122, illus., 9s. 6d.

A handy introduction to those contemplating commercial flower production in England. Attention is paid to economic considerations in general and to the following crops in particular:—chrysanthemums, dahlias, pinks and carnations, sweet peas, roses, gladioli, irises and anemones, flowering bulbs indoors and outdoors.

1645. GRUBB, N. H.

Cherries.

Crosby Lockwood, London. 1949, pp. 186, illus., 30s.

This book marks a definite advance on Bunyard's *Handbook of Hardy Fruits*, published in 1925, in so far as it includes more descriptions of varieties, a number of photographs of tree forms and fruit shapes, and twelve colour plates of fruits. The photographs of tree form show the trees either in blossom or in leaf, and this rather masks the actual tree shape; on the other hand the colour plates are very good likenesses. Edward Bunyard claimed to have grown himself nearly all the cherry varieties described in his book, and many of the descriptions of flowers, leaves, shoots and fruits were taken from comparatively young trees in pots. For his descriptions of tree forms Bunyard took most of his notes from established cherry orchards. Mr. Norman Grubb, in addition to records from his cherry variety collection at East Malling, made careful observations of tree form from cherry orchards in many different parts of the country. It is clear that both these great cherry experts came to regard tree form as being on the whole a better guide to a variety than fruit characters. Bunyard certainly set great store by blossom characters in the identification of cherries, but Grubb, whilst grouping varieties into early, midseason and late blossoming categories, does not appear to have used actual flower characters as aids to distinguish one variety from another. This might have proved a help in the difficult A, B and C variants of Black Tartarian and other cherry varieties, as it undoubtedly seems to have been to Crane when trying to separate out the greengages.

In spite of the many advantages of Grubb's large volume over the small Handbook, it does not by any means supersede Bunyard's little masterpiece, and the two books should always be used together in tracking down cherry varieties. Mr. Grubb has earned the gratitude of everybody connected with cherry growing by this magnificent piece of detailed systematic pomology. He has refused to be hurried into premature descriptions or to be unduly influenced by what other people think. In Part I he has given us the benefit of his ripe experience in the planning, planting and management of cherry orchards, and this forms an admirable background for the Classification and Description in Part II.

And now, please, will somebody buy a ticket for France, and send Mr. Grubb over there with instructions not to come back until he has solved the mystery of St. Lucie and Mahaleb. Mr. Grubb implies in his book that seedling variation may exist in Mahaleb, but that did not deter the workers on St. Julien, Myrobalan, Black Damas and many other plum seedlings from pegging away at them, and separating the sheep from the goats. Nobody seems to have done this for Mahaleb.

N.B.

1646. HILKENBÄUMER, F.

Obstbau. Grundlagen, Anbau und Betrieb.
(Fruit growing.)

P. Parey, Berlin and Hamburg, 2nd edition, 1948, pp. 390, bibl. pp. 3, illus.

The author, one of the leading German pomologists, is professor of pomology at Halle University. The

British scientist will hardly expect to find exciting revelations in a book of this type, but it will be of assistance to all those who want to make themselves acquainted with the German outlook on questions of general interest, such as rootstocks and pruning, and with the problems arising from the special climatic and economic conditions of the country, such as winter hardiness, cover cropping, variety selection, the advisability of specializing in fruit, etc. Although care has been taken to include all German regions, the book is chiefly based on practice in central Germany where the author has worked and carried out observations. The experience of repeated severe winter frosts in recent years accounts for the German preference for stem-builders; but this method of tree raising has its advantages also in other respects: it renders the nurseryman more ready for an unforeseen demand for varieties that have come into fashion suddenly and in many cases reduces by one year the time necessary to produce a saleable tree. It is emphasized, incidentally, that frost hardiness is a varietal character which is largely influenced by environmental conditions, such as snow cover and factors affecting the ripening of the wood in autumn. This should be remembered when a classification of varieties according to frost resistance is attempted. Of the various pruning methods, Kemmer's "naturally-formed top" method [see also *H.A.*, 17: 1216] has found general recognition in commercial fruit growing for trees on the more vigorous rootstocks. It is recommended by the author for that purpose and is fully described. No mention is made of the Oeschberg method of pruning generally practised in Switzerland, with which it has some features in common.

Among other noteworthy questions discussed are the following: *Windbreaks*—Morello cherries planted at a distance of 4 m. provide a good shelter for an orchard of dwarf trees. Wind does not harm the cherry but favours pollination. *Transplanting of dwarf trees* has been found to shorten the time necessary to reach the full bearing stage. Hence, in the Rhineland spindle-bush trees are planted closely in the first place. After a few years 50% are removed and planted up elsewhere. Thus better use is made of the land and a speedier turnover is achieved. For *cultivation* under trees with short stems a small, low hand tractor, with its controls attached at an angle, has proved useful. The operator, walking at the side, can thus work the ground very close to the trees. The chapters on *pest and disease control* convey the impression that the development of spraying equipment lags behind the advances made in the German chemical industry.

Apart from the top and small fruit kinds commonly grown in Britain, apricots, peaches, vines and walnuts are dealt with. Many well chosen photographs illustrate practice, theory and generally interesting phenomena, such as the influence of scion rooting on the vigour of the variety or the effect of spring frost on a fruit tree whose crown emerged from the layer of cold air in a frost hollow.

V.H.G.

1647. HOARE, A. H.

Fruit culture.

Nelson, Edinburgh, 1949, pp. 347, illus., 12s. 6d.

This book, written mainly for the practical grower,

covers all the fruits commonly grown by man. The deciduous fruits receive the fullest treatment, citrus and other miscellaneous fruit, including tomatoes and cucumbers, being dealt with more briefly. The contents are divided into two parts; in the first an account is given of the general principles that apply to all fruits, including nutritive value, distribution of production, propagation, climate, soil, aspect, manuring, pollination, planting, pruning, orchard management, pest and disease control and economics; in part 2 the special requirements of individual kinds of fruit, from apples to the avocado pear, with chapters on fruit for canning, fruit in the home garden and common pests and diseases are considered. Appendices cover the routine to be followed in propagation nurseries for strawberries and raspberries and include a table of planting distances and trees per acre. Unfortunately the width of the field covered appears to have militated against the provision of detail for any particular operation or fruit, and the research worker and the experienced fruit-grower are unlikely to learn very much that is new. New entrants to fruit-growing might, however, find the book valuable as a broad outline that can be filled in later by reference to other works, including the official bulletins that Mr. Hoare edits. Delays in printing are obviously responsible for some of the out-of-date advice, especially as regards control measures, but here and there the advice given is actually at variance with the results of research and experience of some years ago. On the whole the presentation is logical and easy to follow, and the author's style leaves little to be desired. Lists of references for further reading given at the end of each chapter add much to the value of the book.

H.B.S.M.

1648. HOARE, A. H.

Vegetable crops for market.

Crosby Lockwood, London, 3rd edition, 1949, pp. 336, illus., 15s.

The author has spared no pains to bring this book up to date by revision and by the inclusion of three new chapters. One of these is a serious and useful attempt to deal briefly with the chief pests and diseases of vegetables and their control, one deals with the potato, Jerusalem artichoke and, curiously enough, sweet potato, and one is of a general nature. All the more common vegetables grown in England are considered and a chapter is devoted to the production of crops with the aid of glass and electric soil heating. It is interesting to note that there has been a considerable increase in coffee chicory grown in England, and five pages are devoted to the cultivation of this root crop. The large-rooted or Magdeburg chicory is used, the two most important varieties being the Dunkerque and the Palingkop. Appendixes 1 to 4 concern up-to-date notes on grading and packing, fertilizers, accounts, and varieties approved by the Seed Production Committee. There is a satisfactory index. Vegetable growers young and old will benefit from this book.

1649. KAPP, R. O.

The presentation of technical information.

Constable, London, 1948, pp. 147, 6s.

The scientist writing up results of trials walks a perilous road. Knowing his subject and data he is prone to

forget that his readers may not be so fortunate. Knowing his meaning himself, he yet may be ambiguous in his statements. He may, all unthinkingly, assume that his readers are experts or that they are numskulls. If he does any of these things, the results are unfortunate. But if, just occasionally, he has a breathing space, in which qualms assail him on the clarity of his writing, let him spend a very diverting hour with Mr. Kapp. It will help him to appreciate why he cannot always understand the papers of others who work in his field, it should enable him to steer clear of their errors, it will probably show him that common sense, not literary genius, is what his style has hitherto lacked, and it will give him confidence and ensure great satisfaction to his future readers. A subsidiary title to this useful, pleasant book might well be "English without tears".

D.A.

1650. KOSTOFF, D.

Cytogenetics of the genus Nicotiana. Karyosystematics, genetics, cytology, cytogenetics and phylogenesis of tobacco. [Bulgarian and English.] State Printing House, Sofia, 1941-3, pp. 1071, bibl. pp. 34, illus. [received 1949].

This is a bulky tome in stiff paper covers, the large size being partly due to the fact that each chapter in Bulgarian is followed by a full English translation. The English text is on the whole good. The information seems to have been carefully compiled from the results obtained by other workers supplemented by the author's personal investigations. The scope is indicated by the chapter headings, viz. 1. Karyosystematics. 2. Hybridization in *Nicotiana* before the rediscovery of Mendel's laws (1900). 3. Generalization of the data on genetic analysis, inheritance of certain compounds, grafting experiments. 4. Interspecific hybridization. 5. Gene mutations and chromosome changes in *Nicotiana*. 6. Relationship and phylogenesis of tobacco. The 345 figures, mostly from photographs, are well reproduced, and there is a good coloured plate showing types of flower. H.W.

1651. KOTTE, W.

Krankheiten und Schädlinge im Obstbau. (Diseases and pests of fruit trees and their control.)

Paul Parey, Berlin, 2nd edition, 1948, pp. 329, 8 pl. col., 25.60 M. bound, 24.00 M. paper cover.

The second edition of this work brings up to date the control measures now recognized for use against diseases and pests of fruit trees. This edition is especially welcome since the control measures—especially those in use against insect pests of fruits—have changed very considerably with the advent of the many new synthetic insecticides since the publication of the first edition of this book in 1944. The subject matter should, however, be regarded not as the original work of the author but rather as a compilation on the investigations of other workers.

The fact that E.605, the new potential insecticide, at this stage still regarded by many entomologists and chemists as of academic interest only, is suggested for the control of the fruit tree red spider and codling moth, indicates how far the author is prepared to speculate with little-known insecticides. At the other extreme,

the recommendation for the control of pear midge—namely spraying with nicotine while the trees are in full bloom—is quite out of date, and the more recent and efficacious control measures are not mentioned. Also no reference is made to the association of raspberry cane midge and cane blight, when referring to the disorders of the raspberry plant.

The chapter on spraying machines and their use adds to the interest of the book, while the black and white illustrations depicting the stages of fruit bud development form an essential part of a book of this nature. Eight coloured plates illustrating some of the more important diseases and pests do much to enhance the value of the work.

A.M.M.

1652. LANCUM, F. H.

Wild birds and the land.

Bull. Minist. Agric. Lond. 140, 1948, pp. 75, illus., H.M. Stationery Office, Kingsway, London, 2s. 6d.

A handsome publication supplying valuable, and much-needed, information on those British wild birds whose activities are important in agriculture and horticulture. Although concerned primarily with the economic aspect of bird life, it contains much that will be of interest to the naturalist. Its numerous and excellent illustrations are by some of our leading bird photographers.

1653. LENIN ACADEMY OF AGRICULTURAL SCIENCES OF THE U.S.S.R.

The situation in biological science, being a verbatim report in English of the Proceedings of the Lenin Academy of Agricultural Sciences of the U.S.S.R., 31 July-7 August 1948. Foreign Languages Publishing House, Moscow, 1949, pp. 631, 12s. 6d.

Mičurin must surely do a good number of turns in his grave these days, and the rotation rate must have been tremendous during the conference here reported. To those of infinite patience the proceedings can be commended. Moreover, to those who want to find the kernel of Mičurin's theories a study of pp. 356, 435 and others may or may not bring enlightenment, while to those who like a bit of back chat mixed with their arguments they can be recommended unreservedly.

Lysenko's interpretation of Mičurin's principles given in his *Heredity and its variability* as cited by one of the speakers is: "Heredity can be de-stabilized in the following ways:—(1) by grafting, (2) by subjecting plants to environmental influence at definite moments when they are undergoing developmental processes of one kind or another, (3) by crossbreeding, particularly of forms differing sharply in habit or origin". One of the few opponents of Lysenko at this conference suggested that Lysenko had placed the emphasis wrongly and that Mičurin actually taught that sexual hybridization is the basis for changing forms and that the two other chief factors, i.e. grafting and environment, are merely secondary. This suggestion roused a storm of protest from Lysenko and his supporters, their main contention being on the lines of "as if the order mattered!" The final decision, of course, lay with them, and on the last day Lysenko stated that the Central Committee of the Party had examined and

approved his report. Humble pie was then eaten by certain of those present who had previously shown signs of restlessness, and in the words of Lysenko the "present session demonstrated the complete triumph of the Mičurin trend over Morganism-Mendelism" and a resolution to that effect was sent to Joe. And all lived happily ever after—or so we hope. D.A.

1654. MASEFIELD, G. B.

A handbook of tropical agriculture.

University Press, Oxford, 1948, pp. 196, 12s. 6d.

This ambitious manual attempts to cover livestock as well as crops—all in under 200 pages. As the preface so rightly states, it is not for the specialist—who is likely to be critical of, or even shocked by, some of its information.

Its first part (24 pp.) covers soils, implements, haulage, irrigation, and some aspects of economics; part two (100 pp.) embraces crops, tropical, subtropical, and some temperate; part three (24 pp.) diseases and pests; and part four (34 pp.) livestock.

A reference book of this sort should, above all, be accurate and dependable. It is particularly disappointing, therefore, to find that this manual from the Oxford Press is marred by incorrect or misleading statements, e.g.: that *Rubus illecebrosus* is a cross between the strawberry and the raspberry, that the litchee "is propagated by seed, budding, or grafting", that "cocaine is obtained by distillation from the leaves" of coca, that the Muscovy duck is a European breed, and that "the horse is nowhere in the tropics used as a draught animal".

A.G.G.H.

1655. ROBYNS, W., AND OTHERS.

Flore du Congo belge et du Ruanda-Urundi. Spermatophytes. Vol. I. (The flora of the Belgian Congo and Ruanda-Urundi. Spermatophytes. Vol. I.)

I.N.E.A.C., Bruxelles, 1948, pp. 446, illus., 300 fr.

The present volume includes the Gymnospermae, the family Casuarinaceae and the Angiospermae-Dicotyledoneae families Piperaceae to Polygonaceae of Engler's Syllabus. It includes keys for the identification of genera and species, descriptions of species, bibliographies, synonymy, geographical distribution, habitats, vernacular names, and uses. It is well illustrated with 43 plates of beautifully executed drawings, 12 photographs and a coloured frontispiece (the cone and its parts of *Encephalartos laurentianus* De Wild.). It will prove a most useful addition to descriptions of tropical vegetation, and it should find a place in every botanical library. As 10,797 species and varieties have been recorded up to the end of 1940, twenty volumes in this series are envisaged.

1656. SHEAT, W. G.

Propagation of trees, shrubs and conifers.

Macmillan, London, 1948, pp. 479, illus., 25s.

The author assumes a modicum of knowledge in his reader. He deals clearly, in a pleasant style, with the propagation by seed or vegetative methods of most of the species and varieties to be found normally in English nurseries. The paper, print and illustrations leave nothing to be desired, except that the excellent

illustrations were listed. Occasionally the reader will wish for more detail. Thus, instructions to soak seed of *Gleditsia caspica* for an hour in hot water makes one wonder at what particular temperature, and surely the walnut, so popular, but so hard to graft, deserves more than 10 lines of script? Moreover, while the botanical index is adequate, the same cannot be said for the general index, and much valuable matter secreted in the text can only be extricated by long and wearisome search. That there is no lack of valuable information between the cover is certain, only it might be more accessible. It is a book to get and explore and have by one's side in the nursery.

R.J.G.

1657. VAN STEENIS, C. G. G. J.

*Flora malesiana. (A flora of the Malay Archipelago.)**

Noordhoff & Kolff, P.O. Box 103, N.V. Batavia, Java, 1948.

The first sample instalment of *Flora malesiana* gives an idea of the field and scope of this work which will be under the direction of the senior botanist at the Buitenzorg Botanic Gardens. Series I, *Spermatophyta*, is expected to comprise 2,400 genera and 25,000-30,000 species of Phanerogams. The text, which is in English, is clearly printed and illustrated and is on good paper. It is described by the editor as "an illustrated systematic account of the Malaysian flora, including keys for determination, diagnostic descriptions, references to the literature, synonymy, and distribution, and notes on the ecology of its wild and commonly cultivated plants".

The price will depend on the number of subscribers, reduction being arranged for "collaborating", "co-operating" and individual helpers.

The first three volumes of Series I on the Spermatophyta will be entitled *Cyclopaedia of Malaysian botanical collectors and collections*, Vol. 2 Malaysian plant life and Vol. 3 Malaysian plant geography. There are expected to be 15 volumes in the series. Full particulars can be obtained from Batavia from N. V. Erven P. Noordhoff, P.O. Box 39, Groningen, Holland, and from *Chronica Botanica Co.*, Waltham 54, Mass., U.S.A.

1658. STOKOE, W. J.

The caterpillars of British moths including the eggs, chrysalids and food-plants.

Series I and II. Frederick Warne & Co. Ltd., London and New York, 1948, pp. 408 and 381, illus., each series 15s.

These are two volumes in the popular "Wayside and Woodland Series" of natural history books. Series I comprises the families Sphingidae to Brehidae, Series II the families Geometridae to Hepialidae. The compiler writes that "the chief aim throughout has been to provide such authentic and reliable information concerning the early stages in the lives of these interesting creatures, as could be contained within such moderate limits". The numerous illustrations include many reproduced from original water-colour drawings, and some, of eggs, are from photo-micrographs. Dr. G. H. T. Stovin, the Editor, contributes a short introductory preface and an article on "Mendelism in Entomology" in Series I, and an introduction

* Note based on sample copy.

entitled "Hibernation" in Series II. The moths are treated individually with notes on distribution and when the adult is to be found on the wing, and descriptions of the eggs, caterpillar and chrysalis, followed by a list of food-plants. Every field naturalist will want to have these two books, and the amateur entomologist will find them invaluable for the identification of moths in their early stages of life.

1659. THOMPSON, C. R.

The pruning of apples and pears by renewal methods.

Faber & Faber, London, 1949, pp. 210, illus., 12s. 6d.

This book, which should be invaluable to growers of apples and pears, is unfortunately marred by a style difficult to read, and sometimes wellnigh impossible to understand. The reviewer has to admit that after reading some paragraphs four or five times he is still unaware of the meaning they are intended to convey. Nevertheless, he would urge readers not to be deterred by the style, but to assimilate the main principles of Mr. Thompson's methods, even if they find the immense mass of detailed instructions beyond their powers of digestion. There is here a rich harvest of ideas, most of which will be new to the great majority.

Mr. Thompson's central theme, the adaptation of pruning, at least in degree, to the vigour requirements of the trees, as well as to the natural habit of the variety, may not be completely new, but the methods he outlines for achieving these results are entirely his own, and are based in the main on observation and trial in commercial plantations.

The methods themselves could hardly even be outlined in a review. They consist largely of keeping the bearing wood young, doing away by degrees with the older branches, and replacing them with young wood, which the author claims is more fruitful. He claims also to have in large measure solved the problem of biennial bearing. These claims the present reviewer believes to be justified by the facts. One or two other claims are perhaps more doubtful, e.g. (p. 60) "The practice of securing a supply of blossom buds and a supply of young shoots each year is a feature of the Renewal System". As it stands, such a claim is, to put it mildly, rather tall; but probably the wording is not quite happy, and the author intended to be more modest in his claim.

There are a few misprints, one rather unfortunate—the printing of Plate 27 inverted. It is to be hoped that a second edition may soon be called for, when they might be corrected and the author might happily take the opportunity of making a large number of paragraphs more intelligible to the general reader, particularly those on pages 38-39 and 156-157.

In spite of all blemishes, the persevering reader will find himself amply repaid for the time spent on a close study of the book.

N.H.G.

1660. TOTHILL, J. D., AND OTHERS.

Agriculture in the Sudan.

Oxford University Press, London, 1948, pp. 974, illus., 42s.

This book, begun in 1941, is a welcome addition to that all too small list of authoritative works of reference on tropical agricultural practices and their background.

Its editor* and his 28 co-authors have succeeded in the difficult task of describing, mostly in non-technical language, the agriculture of a vast country that extends from rainless desert in the north to tropical rain forest in the south. The book also provides a picture of the progress made by the native inhabitants of the Sudan during the 47 years following Lord Kitchener's reoccupation in 1898—a period of emergence and steady advance of which the British authorities may feel justly proud. In the lay-out of the book and the method of treating the mass of material presented the editor has achieved a nice balance. After a number of background chapters on history, geology, climate, vegetation, soils, transport, revenue, land tenure, land fractionation, education and human nutrition, all of which are necessary for an understanding of the country's problems, the second part of the book is devoted to crop and animal husbandry, weeds, manures, locusts and agricultural research. The valuable chapter, by the late Frank Crowther, reviewing past experimental work, also serves as a sad reminder of the sacrifice made by Crowther and others in the cause of tropical agricultural research. The third section of the book deals with the agriculture of the seven provinces, taken in turn. Noteworthy features are the 400-odd illustrations, the long bibliography of publications on Sudanese agriculture and agricultural research, the numerous maps, and the glossary of Arabic and vernacular names.

A.G.G.H.

1661. UNESCO.

A study abroad. International handbook. Fellowships, scholarships, educational exchange. Volume 1, 1948.

UNESCO Publ. 234, Paris, 1948, pp. 224.

The first edition of a series designed to provide details of all available opportunities for trans-national study, and organized arrangements made in this field. Includes the agricultural sciences.

1662. WATERSTON, J. M.

The fungi of Bermuda.

Bull. Dep. Agric. Bermuda 23, 1947, pp. 305, illus.

The greater part of this book is, as the title indicates, a list of the species of fungi to be found in Bermuda, with notes on host plants or substrata, and records, but this is preceded by descriptions, with maps and photographs, of the geography and meteorology of the islands, a chronological review of mycological and phytopathological work in Bermuda, collecting stations, seasonal incidence of species collected, fungi absent from Bermuda, geographical distribution of Bermuda species, statistical summary, and the location of *Fungi Exsiccati*. The advantages of geographical isolation have been largely offset through the importation of plants, which may bear pathogenic organisms. The vigilance of the authorities, however, has prevented certain diseases from becoming established, e.g. peach leaf curl (*Taphrina deformans*) was intercepted once on peach trees imported from California, and the American brown rot of stone fruits (*Sclerotinia fructicola*) on several occasions on peaches imported from North America.

H.W.

* Also editor of *Agriculture in Uganda*. See H.A., 11: 318, 1941.

1663. WHYTE, R. O.

*Farming for industry.*Todd Publishing Group, London, 1948,
pp. 160, illus., 7s. 6d.

This breezy little book is good value for money. It should be in the pocket of anyone lecturing on general aspects of crop production to local institutes and similar bodies, since it gives just the information necessary to answer a host of likely questions on areas and production of such economic plants as tobacco, rubber other than hevea, oil and essential oil producers, natural and artificial fibres, drug and insecticidal plants, as well as hides and certain other animal products.

D.A.

1664. A.V.R.O.S.

Verslag van der Directeur van het Algemeen Proefstation der A.V.R.O.S. over het tijdsvak I Januari 1940-31 December 1940. (Director's Report of the General Research Station of A.V.R.O.S. for 1940), Batavia 1948, pp. 59.

This report consists of six sections: I, General, II, III and IV, Reports of the agricultural, botanical and chemistry departments, V, Progress of work for the year 1940, and VI, List of publications issued by the station up to the middle of 1948. Sections II-IV contain notes relating to the cultivation of certain tropical crops (including particularly the oil palm and hevea), to anatomical-physiological investigations (including diseases), and the chemical investigations on rubber and palm oil.

1665. BUNDESANSTALT FÜR ALPINE LANDWIRTSCHAFT, ADMONT, AUSTRIA (ZELLER, A.).

Bericht über die Tätigkeit der Bundesanstalt für alpine Landwirtschaft in Admont im Jahre 1947. (Report of the Austrian institute for alpine agriculture at Admont for 1947.)

Bodenkultur, 1948, 2: 281-93.

This very concentrated survey includes brief reports on trials (1) with potato and vegetable varieties, (2) on the time different vegetables require for maturation at altitudes of 640 m.-1,750 m. above sea level, and (3) on sowing dates of peas at altitudes of 1,150 m.-1,750 m.

1666. CALIFORNIA AVOCADO ASSOCIATION.

Yearbook California Avocado Society 1948. Los Angeles, 1948, pp. 174, illus.

Apart from those sections devoted to general articles and avocado research, abstracts from several of which appear elsewhere in *H.A.* under Sub-tropical Crops, this yearbook contains much useful information in the form of reports, etc., on new varieties and registered seedlings, rootstocks, and plant exploration.

1667. CANTERBURY AGRICULTURAL COLLEGE, N.Z.

Annual Report Canterbury Agricultural College for year ending 30 June, 1948, pp. 59.

The research section of the report includes a note on the harvesting and threshing of small seeds.

1668. COMMONWEALTH ECONOMIC COMMITTEE.

Fruit: a summary of figures of [world] production. . .

H.M. Stationery Office, Kingsway, London, 1949, pp. 88, 5s.

A summary of figures of world production and trade relating to apples, pears, plums, peaches, oranges, grapefruit, lemons, bananas, grapes, raisins and currants, wine and canned fruit.

1669. C.S.I.R. AUSTRALIA.

*An account of research work in the Division of Food Preservation.**Food Pres. Quart.*, 1948 (commemorative number 1938-48), 8: 42-63, illus.

This number of the *Food Preservation Quarterly* commemorates the first decade of the work of the Division of Food Preservation and Transport at the Homebush Laboratory, New South Wales, by a report of the research carried out there since 1938. This includes investigations into the storage and handling of citrus fruit, apples, pears, plums, peaches, bananas and pawpaws. Respiratory studies have been made on whole fruits over many seasons, under a wide variety of conditions of harvesting and storage, and work is in progress to correlate tissue respiration with the respiration rate of the whole fruit. Using carrot tissue, evidence has been obtained on the quantitative relationship between "salt respiration" and salt accumulation. [A report of the work of this Division will also be found in the Annual Reports of the C.S.I.R. Australia, which are abstracted in *H.A.* regularly.]

1670. DANSK GARTNERFORENING (DANVIG, A. M., AND PEDERSEN, K., editors).

Årbog for Gartneri 1948. (Horticultural Yearbook 1948.)

S. L. Møllers Bogtrykkeri, Copenhagen, 1949, Vol. 30, pp. 432, Kr. 3.—.

As usual, the first section of the yearbook is devoted to a survey of horticultural institutions, including research stations, associations, schools and periodicals in Denmark, followed by statistical data on production and the import and export of horticultural products. Among the many small-scale manurial and other trials reported the experiments on the heat treatment of tulip bulbs (pp. 155-63) call for special mention. They were carried out at Voldby with the object of determining how best to promote the vegetative growth of the bulb in the soil by suppressing flower bulb formation. Temperatures used ranged from 25°-35° C. applied for periods of $\frac{1}{2}$ day to 2 weeks. The results, which are encouraging, suggest that the second half of August is the best time for treatment. If applied later, it has a weakening effect. This shows incidentally that bulbs should not be exposed to high temperatures in transit or storage. Extensive variety trials were carried out, partly at the state research stations, with roses, carrots, cauliflower, lettuce, radishes, horse radish and savoy. In each case the presentation of data is followed by a summary of the approved varieties. Reasons are given for the rejection of the remaining varieties tested.

1671. D.S.I.R., NEW ZEALAND.

Twenty-second Annual Report of the Department of Scientific and Industrial Research, New Zealand, 1948, pp. 38, 1s.

Amongst items of horticultural interest in the report of the Research Committee are the following. *Fruit research:* Apples: The value of N, P, and K applications for lessening the severity of crop reduction due to

biennial bearing in Cox's Orange, Dunn's Favourite, and Delicious was demonstrated. On clay soils Sturmer apples on Malling XII and own-rooted Sturmer gave increases of 59% and 53% respectively over check trees on Northern Spy stocks. In light volcanic soils trees on Sturmer roots gave 200% more than those on Northern Spy. Citrus: New stock and scion combinations with experimental material resulted in great improvement in the quality of some fruit. *Frost research:* The freezing of apricot buds *in situ*, artificially, demonstrated the practicability of this method for determining critical temperatures. At 1° F. severe damage occurs within 10 minutes. *Diseases:* Brown rot of Golden Queen peaches was controlled by "Phygon" applied 21 and 7 days before picking. Mercurated lead arsenate is the only therapeutic showing promise for checking apple black-spot without causing plant injury. Stony-pit of pears was found to be graft transmissible and not a physiological disease. Cox's Orange trees in the Tasman-Mariri area are increasingly affected by collar-rot. *Hop research:* A Hop Research Station is being established. Preliminary surveys confirm that root-rot is a major problem. *Tobacco research:* Work included fertilizer and variety trials, breeding, chemical investigations on intake of plant nutrients and chemical composition of leaf in fertilizer and curing experiments, disease surveys, etc. *Fruit cold storage research:* DDT sprays at 4 or 8 oz. per 100 gal. had no detrimental effect on the storage of Sturmer apples. Cox's Orange fertilized with P and K, in addition to N, developed less breakdown and fungus, but more pit scald and pit than those given N only. With Jonathan, increasing amounts of N reduced storage quality. Delicious was virtually unaffected by manurial treatment. In studies of the effect of rootstock on cold storage quality M. XV replaced M. XII as the best stock for Jonathan. M. I and Northern Spy were relatively inferior.

1672. FLORIDA.

Annual Report of Florida Agricultural Experiment Station for year ending 30.6.47, pp. 260 [received 1949].

There is much of interest to horticulturists in this tightly compressed report covering over 190 projects and including separate sections on agronomy, horticulture, entomology, pathology, frost warning service, etc., as well as reports from 7 branch stations and 6 field laboratories dealing with potatoes, vegetables, strawberries, tung, citrus, water-melons and grapes. *Horticulture:* Among the many projects reported are those on: propagation, planting and manuring of tung, native and introduced shrubs and ornamentals, cover-crops in pecan orchards, vegetable selection and varieties, composition of vegetables as affected by environment, effect of boron on deciduous fruits and nuts, strawberry varieties, dehydration of vegetables and fruit, cold storage of citrus. *Sub-tropical Station:* Work is reported on the effect of minor elements on avocados and papaws, chlorosis of non-bearing avocados, the improvement of the guava, the control of potato and tomato diseases, tomato and cabbage varieties, diseases of Tahiti lime, biological control of insects affecting sub-tropical fruits and winter vegetables, control of pineapple mealybug. *Citrus Station:* Once again citrus in plots deficient in one or more

elements suffered more severely from frost than that in plots fully manured. Brief reference is made to nutrition studies, melanose and stem-end rot, control of scale-insects and mites, biological control of citrus insect pests. Of "decline" it is stated that there are 10 common causes. "Spreading decline", which is becoming serious, is possibly caused by the nematode *Tylenchulus semipenetrans*. Other investigations reported concern the effects of DDT on citrus, snails in citrus groves, scale-insects, irrigation, citrus growing in coastal areas, the chemistry of insecticides and citrus storage. *Vegetable crops laboratory:* Among projects mentioned are variety trials, breeding tomatoes for combined resistance to diseases and pests, control of sweet corn pests, investigation of nutritional disorders of vegetables, control of mole crickets.

1673. FRUIT AND VEGETABLE PRODUCTS RESEARCH COMMITTEE, DEPARTMENT OF AGRICULTURE, CANADA.

Annual Report 1947.

Consists of 7 reports as noted below:—

- (i) Kentville, N. S. (Hope, G. W.). *Report of Cold Storage Laboratory, Kentville, N.S., 1947-48*, pp. 5. The effects of fertilizer on keeping quality were not clearly demonstrated.
- (ii) Division of Horticulture C.E.F. (McArthur, M., and Johnston, F. B.). *Report of Fruit and Vegetable Products Laboratory, Ottawa, 1946-47*, pp. 38. This concerns the freezing of strawberries, peaches and a number of vegetables and miscellaneous trials of nutritional values of raspberry, black currant, strawberry, tomato and apple varieties.
- (iii) Summerland, B.C. (Atkinson, F. E., Strachan, C. C., and Moyls, A. W.). *Annual Report of Fruit and Vegetable Products Laboratory, Summerland, for 1947*, pp. 33.

Concerns variety canning tests for apricots, peaches, prunes and tomatoes, storage of fruit for canning, freezing fruits and vegetables, ascorbic acid values of fruits and vegetables stored or treated in different ways.

- (iv) Division of Bacteriology and Dairy Research C.E.F. (Jones, A. H., Bowen, J. F., and Campbell, R. H.). *Report of Division of Bacteriology and Dairy Research, 1946-47*, pp. 8.

Concerns frozen pack vegetables and fruits and tomato products.

- (v) Division of Horticulture C.E.F. (Phillips, W. R., and Poapst, P. A.). *Report on Low Temperature Investigations for 1947-48*, pp. 31.

Includes notes on effect of origin on storage of apples, oil dipping, potato sprout inhibitors.

- (vi) Summerland, B.C. (Fisher, D. V., and Britton, J. E.). *Report of Cold Storage Laboratory, Summerland, for 1947-48*.

Studies on design and operation of air duct systems, pp. 9; McIntosh packing and storage, pp. 6.

- (vii) Morden, Manitoba (Shewfelt, A. L., and Haigh, M.). *Report of the Fruit and Vegetable Products Laboratory, Morden, 1947-48*, pp. 20.

Concerns sorghum and maple syrups, freezing plums, raspberries, strawberries, gooseberries, asparagus, bean, corn, peas, spinach and methods of analysis.

1674. HORTICULTURAL EDUCATION ASSOCIATION.*

Annual Report 1947 and Report of 39th Annual General Meeting, 1948, pp. 116.

Includes a list of National Agricultural Advisory Service Officers (horticulture) in England and Wales.

1675. INDIAN TEA ASSOCIATION.

Annual Report of the Indian Tea Association (Scientific Department), Tocklai, for 1946, 1947, pp. 25 [received 1949].

Experiments on estates: Field trials have shown that applications of potash and phosphates to tea in N.E. India are unlikely to give a satisfactory return under existing conditions. In compost experiments green jungle growth was more efficient if applied to tea uncomposted. **Agricultural Chemistry:** In comparative field trials of 7 kinds of shade trees, there was no significant effect from any type of shade. Results of experiments on the manuring of unshaded tea indicate that 160 lb. of N per acre appears to be the upper limit of manuring advisable. Pruning experiments over 10 years show that any cleaning more severe than the removal of banjhi growth fails to give any return in crop; further, with light cleaning no advantage is gained from leaving a long growth of new wood on mature tea. **Botany:** Reference is made to: new introductions of breeding material, hybrid progeny, the successful pretreatment of internode cuttings before planting, and the discovery of a relationship between depth of colour in the green leaf and the quality of the manufactured tea (the lighter the leaf the better the quality). **Pathology:** Experiments demonstrated that the fungus causing black rot (*Corticium invisum*) is capable of living through the winter on lightly buried prunings and of re-infecting tea bushes the following season. Investigations on red rust (*Cephaeleros parasiticus*) and eelworms are reported.

1676. I.N.E.A.C.

Rapport annuel pour l'exercice 1947. (Report of work of I.N.E.A.C. stations, 1947.)

Institut national pour l'étude agronomique du Congo belge, Brussels, 1948, pp. 217, 80 fr. [received 1949].

The following items are taken from the reports of the central research station at Yangambi and the crop experiment stations for rubber, fruits, and fibres. **Oil palm:** over 5 million seeds were distributed during the year, mostly from the crosses *tenera* \times *dura* and *dura* \times *pisifera*. **Coffee and cacao:** plant selection methods and cultural experiments are described. **Rubber:** the relative resistance to wind of various clones is mentioned. The campaign against root disease [not named] using various named fungicides continued, the cost of treatment varying from 7.5 to 33.5 man-days per hectare plus cost of materials and general expenses. Grafting in the field appears to give better results than nursery grafting. The progress of selection work is recorded. **Sisal:** in an experiment to test the effect of shade, minor elements and manures

on the incidence of leaf scald it was found that scald was reduced by increasing the shade, within limits. Brief reference is made to experiments on deep tillage, shade and tillage combined, and mixed cropping (sisal and bananas). *Agave amaniensis* is said to suffer from the same physiological troubles as *A. sisalana* and in reafforested savannah soils it develops collar rot, despite its vigorous growth. **Citrus:** rootstock trials of orange, grapefruit and mandarin grafted on sour orange (*C. bigaradia*) and rough lemon growing on both irrigated alluvium and plateau soils showed the superiority of the rough lemon stock and of the alluvial soils. Other rootstock experiments and a combined variety-manurial trial are reported. **Bananas:** a new high-yielding variety, Inekele Ikumi, much appreciated by Africans, is announced. Seed-bearing *Musa* species were planted for cytological studies and crossing. Experiments are reported on: organic manuring, intensive treatment; influence of tillage; and mulching. **Other fruits:** reference is made to experimental work with pineapples, avocados and mangoes.

1677. INTERNATIONAL CONGRESS FOR MICROBIOLOGY (BJØRNEBØE, M.).

Report of Proceedings 4th International Congress for Microbiology, Copenhagen, July 1947.

Rosenkilde and Bagger, Copenhagen, 1949, pp. 649.

This report consists chiefly of summaries of papers read at the Congress. Those of horticultural interest include the following under Section VI, Plant Pathology and Mycology:—

Les hyphomycètes prédateurs des larves de nématodes parasites des végétaux et des plantes. (The hyphomycetous predators of nematode larvae parasitic on plants), by Deschiens, R., and Lamy, L. (France.) Ueber das Problem der Welkekrankheiten bei Pflanzen. (The wilt problem in plants), by Gäumann, E. (Switzerland.)

Conditions for the spread of some important insect-borne virus diseases in agricultural crops [including potato] in Denmark, by Hansen, H. P. (Denmark.) Recent research at East Malling on the identification of strawberry and raspberry viruses, by Harris, R. V. (England.)

The selective transmission of one virus from a complex of two non-persistent plant viruses by *Myzus ornatus* Laing, by Kvíčala, B. A. (Czechoslovakia.) Turnip yellow mosaic, by Smith, K. M. (England.)

1678. JORK OBSTBAUVERSUCHSANSTALT.

Mitteilungen für die Mitglieder des Obstbauversuchsringes des Alten Landes und der Arbeitsgemeinschaft Baumschulen im Obstbauversuchsring, Obstbauversuchsanstalt Jork. (Leaflets of the Altenland Fruit Research Association, Jork.)

Jork, Bez. Hamburg.

The leaflets are (usually) 4-page communications published by the active growers' fruit research station, Jork, Altenland, Germany, with the two-fold object of catering for the grower and nursery members of the Association and serving as the organ for the publication of scientific papers by the staff. The numbers in our possession from No. 5 of 1 June 1947 onwards, contain

* Secretary, E. W. Hobbis, Long Ashton, near Bristol.

some interesting material that has been abstracted and will be found in its proper place.

1679. THE LAND SETTLEMENT ASSOCIATION LTD.
Thirteenth Annual Report of the Land Settlement Association Ltd., 1947-48, pp. 35.

The last report as a separate entity, the Association's smallholding properties and other assets having been transferred to the Minister for Agriculture as from 1 April 1948.

1680. MACAULAY INSTITUTE.

Annual Report of the Macaulay Institute for Soil Research, 1947-48, Aberdeen, 1949, pp. 31.

Spectrochemistry. New or modified methods of spectrographic analysis of soils and plant materials are being developed to cover an extended range of elements, and to suit samples other than those normally dealt with, for instance, seaweeds. Data are being obtained on the normal composition of soils and plants, in order that the results of spectrographic analyses may be subject to more valid interpretation. In the course of investigations on the effect of trace elements on plant growth, sisal leaves affected with banding disease were analysed; this disorder would appear to be due to potassium deficiency and not to a trace element.

Soil organic matter. The study of the microbiology of composting was continued with an investigation into the part played by fungi in the process of decomposition. With lawn mowings the fungi present in the fresh material are largely destroyed during the high temperature phase, and do not re-establish themselves. With barley straw, however, they re-establish themselves rapidly, and so play an important part in the decomposition. Dominant organisms are being isolated, and investigations are being made into their physiological activities with particular reference to cellulose breakdown.

Plant physiology. Nutritional experiments on strawberries, raspberries and gooseberries have been started to obtain information on ion antagonism, the distribution of nutrients throughout the plant, and the effect of soil treatment on yield, tissue composition, and the incidence of nutritional and parasitic disorders. The absorption of magnesium by tomato plants growing in soils of high salt content and high potassium-magnesium ratio, conditions which reduced the magnesium status of the plant to deficiency levels, was studied, and experiments confirmed the beneficial effects of heavy dressings of peat worked into the top soil. Sand culture experiments have been used to investigate other factors which affect magnesium absorption.

Soil fertility. Investigations include (1) the responses to and interactions of N, P, and K in various combinations, (2) the nutritional requirements of crops, (3) the effect of soil type on the lime and fertilizer requirements of a range of soils, (4) the crop producing capacities of different soils. Continued experiments comparing the values of various liming materials confirm that differences in the effectiveness of the various materials are small compared with the overall beneficial effect of liming. Phosphate experiments show that, because of the high fixing power of most soils, moderate, frequent dressings are better than heavy, infrequent ones. Fertilizers in granular form were found to be quite as effective as those in powdered form.

1681. MAURITIUS.

Annual Report Mauritius Department of Agriculture 1947; 1948, pp. 73, Rupee 1.

Apart from sugar-cane research, for which see H.A., 18: 3142, the following activities, amongst many others, are reported in brief in the several appendices following the administrative section of this report. **Fibre.** Enquiries into the possibility of developing the local small-scale industry in *Furcraea* fibre. **Tobacco.** Seed-bed treatments, manurial trials, plant breeding and selection, trials of imported varieties. The cross Amarella \times Bonanza appears to be superior to either parent. Work on black shank resistance continued. **Weed control.** Insect parasites of the noxious weed, *Cordia macrostachya*, were introduced from the West Indies. Work on herbicides continued. Large areas have been freed from *Hydrocotyl bonariensis* by means of hormone weed-killers. **Miscellaneous.** Brief reference is made to the following crops: tea, tung, vegetables (for seed), chillies, litchi, citrus, mango and other fruits.

1682. NATIONAL INSTITUTE OF AGRICULTURAL BOTANY, CAMBRIDGE.

Twenty-eighth Report and Accounts 1946-47, N.I.A.B., 1949, pp. 25.

Very short notes are given of variety trials with the following vegetables: brussels sprouts, broccoli, early cauliflowers, onions, drying peas, and potatoes. It is noted that the arrangement has been made for the National Agricultural Advisory Service to take over all responsibility for field advisory and inspection work in connexion with seed production.

1683. NEW YORK STATE.

66th Annual Report New York State Agricultural Experiment Station, 1947, Geneva, New York, 1948, pp. 65.

The following are amongst the research activities reported. **Entomology:** controlling Japanese beetle on fruit with insecticides; evaluation of 4,6-dinitro-o-cresol and its salts as insecticides; control of (1) apple maggot, *Rhagoletis pomonella*, (2) cranberry rootworm and red-banded leaf roller, (3) fruit flies on cherries, (4) oriental fruit moth on peaches, (5) Mexican bean beetle, (6) potato aphid on tomatoes, (7) the European corn borer, and (8) the gooseberry fruitworm on currants; breeding of aphids for virus transmission experiments; investigations of grape insects; and a study of the biology and control of the European chafer.

Plant pathology: investigations into the control of carrot and cabbage yellows, tomato and grape diseases, anthracnose and leaf spot of raspberries, apple scab and rust, brown rot of stored fruits, peach leaf curl, cherry leaf spot, downy mildew of hops; the development of new fungicides, and of disease-resistant hops.

Pomology: manures and pruning systems for grapes; variety trials for hops, apples, pears, peaches, nectarines, apricots, plums, cherries, grapes and small fruits; fruit breeding; dwarfing rootstocks for commercial orchards. **Seed investigations:** physiology of germination, seed-borne micro-organisms. **Vegetables:** manurial and seed-rate experiments, breeding new varieties of beans and tomatoes, different methods of growing tomato plants.

1684. NIGERIA.

Annual Report of Nigeria Agricultural Department for 1946, 1948, pp. 55, 9d.

The following items are culled from this report which is mainly administrative. *Oil Palm Research Station*: Experiments are reported on transplanting technique and the control of root rot in nurseries. Apart from transplanting losses, the most serious cause of loss amongst young palms are rodents. Wire netting collars give effective protection. The production of improved seed of the following crosses continued: *dura* \times *dura*, *d.* \times *tenera*, *d.* \times *pisifera*. The demand for this seed exceeded supply. *Other crops*: Brief reference is made to work done for the improvement of cacao, cinchona, citrus, coffee, kola, sweet potatoes and sugar-cane. Cacao selection T 38 promises well in the W. Province. A selfing of *Corissa edulis* is said to give an interesting and pleasing fruit. *Cacao survey*: Progress was made with this survey which, apart from revealing the existence of swollen shoot disease, has disclosed some important facts with regard to the industry itself. The cutting out of diseased trees on infected farms was undertaken.

1685. NORTH CAROLINA.

70th Annual Report N. Carolina Agricultural Experiment Station, 1947, being *Research and Farming*, Vol. 6, No. 3, 1948, pp. 93, illus.

The following items are selected from the many briefly reported. *Tobacco*, Effect of manuring on composition and quality of cigarette tobacco, improved designs for curing barns, prevention of sucker development by growth regulators, breeding for resistance to wilt and black shank, control of root-knot and meadow nematode by soil fumigants, black root-rot studies, new fungicides against blue mould, tests of lines resistant to fusarium wilt, herbicides for seed-beds, effect of pruning on Burley. *Horticultural crops*, *Armillaria* and nematode attack on peaches, plum curculio, *Physalospora obtusa* and mouldy core in apples, magnesium for chlorosis of grapes, new dewberry variety 38-7-3, copper deficiency of strawberries, strawberry variety tests, potato tests (spacing, defoliation, bacterial wilt resistance), sweet potato trials (vitamin content, improved varieties, internal cork disease, vine-row harvester), trials of new snap bean strains, breeding tomatoes for resistance to southern bacterial wilt, control of cucumber downy mildew, removal of cryolite residues from vegetables, chemical soil treatment to reduce root-knot of vegetables, vitamin C content of collards.

1686. PENNSYLVANIA.

61st Annual Report Pennsylvania Agricultural Experiment Station for year ending 30.6.48, being *Science for the Farmer Bull.* 502, pp. 60.

The following items are selected from this report. *Orcharding*: the success of Stayman apples on Malling XII rootstocks has led to an increasing demand for this stock. Malling II has also shown its value as a stock for Rome apples. Numerous combinations of Malling rootstocks are under test. Current findings indicate that stronger apple trees result when no pruning is done in the nursery or during the first 2 years in the

orchard. Other investigations reported include: rejuvenation of old apple orchards, control of codling moth and grape berry moth with DDT, red mite control, peach variety trials, tests of benzene hexachloride against peach curculio, trials of mazzard cherry seedlings resistant to leaf spot, use of glyoxalines for control of apple scab and cherry leaf spot. Phygon continued to give outstanding results against brown rot of peaches. *Vegetables*: progress in breeding potatoes, lettuce, hybrid tomatoes and hybrid sweet-corn is reported. New races of late blight have appeared which attack all the so-called blight-immune potato varieties introduced into the U.S.A. Trials of 27 fungicides against potato diseases are mentioned. *Mushrooms*: trials of vaporized DDT in mushroom houses indicate that it is highly effective against Sciarid and other flies. *Tobacco*: strains resistant to mosaic and black rot are mentioned. Some results from trials with German low-nicotine varieties are given.

1687. PURDUE UNIVERSITY.

59th and 60th Annual Reports Purdue Agricultural Experiment Station for the years 1945-46 and 1946-47.

Lafayette, Indiana, pp. 86 and 128 [received 1949].

The undermentioned projects amongst many others, are very briefly reported. *Tomatoes*: maturity studies, breeding for disease resistance and high vitamin A and C content, yield trials of *F*₁ hybrids and of canning varieties, relationship of nutrition to yield. *Potatoes*: variety and time of planting trials, breeding for scab-resistance, use of sulphur against scab. *Fruits*: variety studies of stone and other fruits in relation to cold resistance, etc., effect of soil management and manurial treatments in orchards, scion-stock problems of apples, rhubarb breeding. *Miscellaneous*: production problems of glasshouse vegetable crops, physiology of flowering of glasshouse crops, technique of seed sampling, and seed germination studies in relation to enzymes, breeding mint and testing for disease-resistance, breeding hybrid maize, soil studies.

1688. QUEENSLAND ACCLIMATISATION SOCIETY.

82nd Report of the Queensland Acclimatisation Society 1947-48, pp. 9.

Amongst the fruits mentioned as grown are 22 varieties of avocado, including 9 raised by the Society.

1689. RENDEL GOVAN, H. A.

Report on the fruit-growing possibilities of the Moray Firth area.

The Scottish Council (Development and Industry), 20 George Street, Edinburgh, 1949, pp. 26, 2s.

This report marks the first stage of a more comprehensive investigation by the Scottish Council into the potential resources of the Moray Firth area. It gives a clear and very encouraging account of the possibilities of soft fruit growing in the district, provided the industry is well planned, run on a co-operative basis and in conjunction with the existing processing firms. Although the district, being relatively virus-free, is eminently suitable for the production of propagation stocks of raspberries and strawberries, strong reasons are given for the production of fruit as well as stocks.

Fruit growing, however, should be limited, in the first instance, to what can be utilized as fresh fruit in the North of Scotland and processed locally. Soil and climatic conditions, the interests of the canners and preference of pickers point to raspberries as the crop on which an immediate start should be made, although there is also room for development in the production of strawberries, black currants, plums, cherries, greengages and damsons. The rowans, cranberries and blueberries that grow wild in the district could probably be cultivated and processed, and might prove a valuable specialist line. The growing of high quality raspberries for processing is particularly suitable for the small farmer or crofter, with $\frac{1}{2}$ to 2 acres of available ground. The importance of a local Fruit Growers' Association, to co-ordinate such an industry distributed among many small growers, is strongly emphasized. Such an association could prevent the importation of virus-infected stock, help to maintain quality of produce, market on a co-operative basis, and plan to avoid over-production.

1690. TANGANYIKA TERRITORY.

Annual Report of the Sisal Experimental Station 1946, 1948, pp. 17, cents 50 (6d.).

An unprecedented drought seriously affected the growth of sisal. Up-to-date results from numerous uncompleted field trials (cultivation, spacing, cutting, manurial etc.) are reported. The factors which influenced the design of these trials (the 2nd series) are traced. The results from the original cultivation trial were overwhelmingly in favour of continuous clean weeding. Later, it was thought that weed competition is possibly most harmful when sisal is young and that it may be unnecessary to continue clean weeding right through the life of the crop. This conception was confirmed by a trial in which the sisal was clean-weeded for the first 2 years and the soil cover then allowed to develop in various degrees. Results from spacing trials to date show the many advantages of spacing the crop in double rows 4 metres apart, a system which can now be confidently recommended on estates, since it provides access to the crop at all times, allowing some mechanized operations, while at the same time the soil between the double rows can be protected from exposure and erosion by a recumbent cover crop without checking the growth of the sisal or causing a significant decrease in fibre yield, such as was recorded when a cover crop was grown between sisal planted in single rows nearer together.

1691. TUCUMAN.

Memoria anual del año 1945. (Annual Report of the Tucuman Agricultural Experiment Station for 1945.)

Rev. industr. agric. Tucumán, 1946, 36: 129-72 [received 1949].

Work done on the following subjects is of special interest. *Citrus*. As a result of 12 years' study, recommendations are made for rootstocks that could be used as an alternative to the sour orange, if the "quick decline" disease of this stock broke out in Tucuman. (1) *Poncirus trifoliata* has not proved a suitable stock in N.E. Argentina for any citrus tree, with the possible exception of Ruby Blood orange. (2) Rangpur shows signs of decreasing vigour, but trials will be made to discover whether this is due to

soil exhaustion. Otherwise sweet orange and mandarin do well on this stock and give an early crop. (3) *Citrus paradisi* is highly resistant to root rot, although in low, rainy districts it is advisable to plant on slight mounds. It is vigorous, and an excellent stock for grapefruit, and for the strong growing varieties of lemon and sweet orange. Mandarins on *C. paradisi* ripen 15-20 days later than on Rangpur, a serious disadvantage where the early market is the aim; it is, moreover, susceptible to neck rot. (4) Sour orange stock should only be used for lemons. When grafted with lemons it is resistant to root rot and gummosis. (5) Oneco and Cleopatra mandarin stocks are very promising for sweet oranges and mandarins, but need further trial. (6) None of the *Citrus aurantifolia* stocks can be recommended. The Persian lime does well for 5-6 years with sweet oranges (although incompatible with Ruby Blood) but under local conditions is short-lived. Its immunity to root rot and "quick decline" is disputed. The necessity for guarding against an epidemic of "quick decline" is strongly urged, and heavy dressings of fertilizers and green manuring are advised to keep the plantations in good health. Suspected cases of the disease were found to have been due to a copper deficiency; sprays with bordeaux mixture will cure this. Experiments were made to determine the effect of planting at different depths. High planting is recommended as a protection against neck rot. *Tung*. Experimental plantations of clonal tung trees have given good results. Scions of *Aleurites fordii* from selected parents, grafted on stock of the same species, have given good, uniform crops, more profitable than the usual seedling plantations. *Diseases of sugar-cane*. The reasons for the immunity of some varieties of sugar-cane to *Ustilago scitaminea* are being studied. Inoculation of terminal buds and side shoots resulted in infection, thus showing that immunity is not due to the chemical composition of the plant. It is more likely to be due to bud structure. A leaf spot disease, possibly a mosaic, that attacks Tuc 2613, and a new disease causing stunting and twisting of the stem, are being investigated. *Disease of tobacco and tomatoes*. Further trials with DDT prove conclusively that it is useless for the control of thrips, the vectors of mosaic and "peste negra".

1692. WESTERN CANADIAN SOCIETY OF HORTICULTURE.

*(Mimeographed) Reports of Proceedings of the Western Canadian Society of Horticulture.**

First Meeting, 1943, pp. 45,

First Annual Meeting, 1944, pp. 76,

Second Annual Meeting, 1945, pp. 66,

Third Annual Meeting, 1947, pp. 82,

Fourth Annual Meeting, 1948, pp. 82.

The society was founded at a conference of technical horticulturists at Regina in 1943, called largely as a result of the heavy loss of horticultural plants, particularly fruits, following the severe winter of 1942-43. The object of the society is to further the development of horticulture in the prairie provinces of Manitoba, Saskatchewan, and Alberta. The reports cover a wide field including: zoning of horticultural plants; recommended varieties of fruits, vegetables and ornamental

* Received by courtesy of the Secretary, 1949.

plants; winter injury; plant breeding and selection; new plant varieties and introductions; hybrid vigour; nomenclature; rootstocks; soils; climate; irrigation; rodent repellants; chlorosis; weed control; identification of fruit varieties, etc.
 [Numerous items of the proceedings are abstracted elsewhere in this number.]

1693.

The following also have been examined:

a BRITISH COLUMBIA.

Agricultural statistics report, year 1947.
Publ. Dep. Agric. (Statistics Branch), B.C., 1948, pp. 51.

b CAMBRIDGE UNIVERSITY SCHOOL OF AGRICULTURE.

A summary of the papers published by the members of the staff of the School of Agriculture and its associated research institutes during the period October 1st, 1947-September 30th, 1948.

Mem. Cambridge Sch. Agric. 20, 1949, pp. 28, 2s.

c CATT, C. H.

The budding gardener.

Pilot Press, London, 1948, pp. 125, illus., 5s.
 An elementary but useful handbook for the English school garden.

d COMMONWEALTH AGRICULTURAL BUREAUX.

Nineteenth Annual Report of the Executive Council, C.A.B., 1947-48.

H.M. Stationery Office, Lond., 1949, pp. 42, 2s. 6d.

e DIENST VAN DE LANDBOUW, BUITENZORG.
 Lijst van publicaties van het algemeen proefstation voor de landbouw. (List of publications of the general agricultural experiment station.)

Meded. alg. Proefst. Landb. Buitenzorg, Java, 61, 1948, pp. 12.

f MISSOURI.

Annual Report Missouri Agricultural Experiment Station 1944-45, being Bull. 510, pp. 71 [received 1949].

g NATIONAL INSTITUTE OF AGRICULTURAL ENGINEERING.

Tractor ploughing.

H.M. Stationery Office, London, revised edition, 1948, pp. 40, illus., 1s. 6d.

h NATIONAL SHADE TREE CONFERENCE.

Proceedings and Annual Meeting 24th National Shade Tree Conf., Milwaukee, Wis., 1948, pp. 190.

i WHITEHEAD, G. E.

The quarter acre garden.

Pilot Press, London, 1947, pp. 124, 6s. 6d.
 Vest pocket utility, readable and sensible.

j WISCONSIN.

What's new in farm science.

Pts. I and II 63rd Ann. Rep. Wisconsin Agric. Exp. Stat., 1945/6, being Bull. 471 and 472, pp. 73 and 63.

Pt. I 64th Ann. Rep. Wisconsin Agric. Exp. Stat., 1946/7, being Bull. 474, pp. 68.

Illustrated reports written in popular form.

